The IRON AGE

June 2, 1960 A Chilton Publication The National Metalworking Weekly

Law Merrim

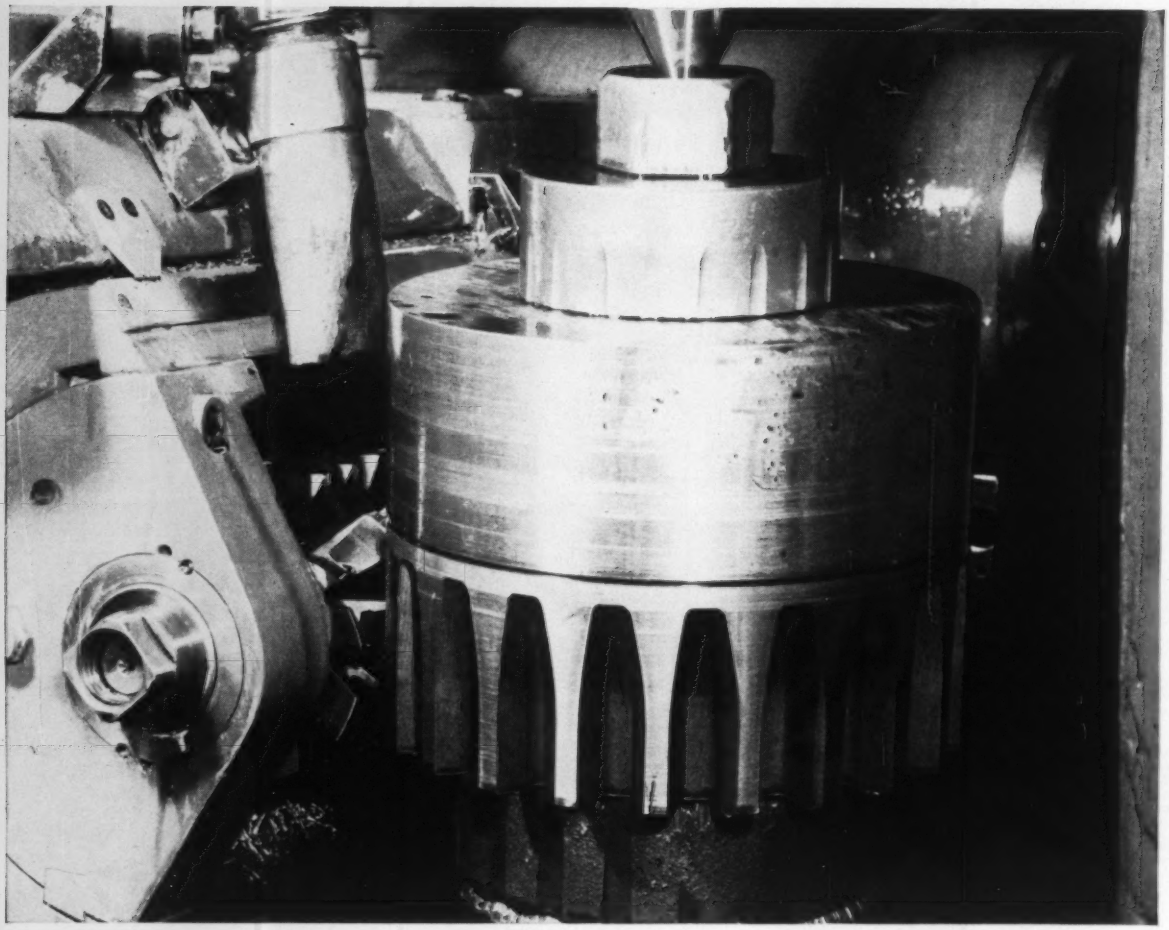
Linde Co.'s Hodge and Wyczalek:

Computers Predict How Additions Act In Blast Furnace P. 61

How to Make Foremen Real Managers – P. 23

Steel Leaders Assess Industry Problems – P. 26

Digest of the Week – P. 2-3



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Aristoloy Leaded increases hob speed 50% . . . prolongs tool life 50% for Boston Gear

Together these add up to 100% satisfaction with Aristoloy Leaded* steel. By switching to Aristoloy Leaded, Boston Gear now machines three 7" Spur Gears per hour. Best production achieved on the steel previously used was two per hour.

With Aristoloy Leaded, 24 gears are cut before the hob needs sharpening . . . only 16 were possible with other steel used by Boston Gear.

Strength and hardenss of the finished part show no detectable difference in physical properties from the unleaded steel used earlier.

For complete information about Aristoloy leaded or standard analyses carbon, alloy, and stainless grades, write for booklet entitled, "A Complete Line of Leaded Steels," and new Products and Facilities Catalog.

ARISTOLOY STEELS

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ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

A small fable with a large moral

A Farmer owned a sleek Jersey cow.
He milked the cow every day,
and his children drank every drop.
One day a neighbor said to him:

"Charlie, my cows give more milk than I need.
I'll sell you a bucket a day very cheaply,
and you won't have to bother with milking any more."
The Farmer had a nose for bargains.
He accepted the deal. Instead of milking twice a day,
he had more time to watch TV.
Then one day his neighbor's wife had triplets.
They no longer had any milk to spare.
The Farmer tried to milk old, faithful Bossy,
but—alas—she had dried up.

MORAL: If you don't milk the cow you have, some day you may be awfully thirsty.

Whether you're a farmer or steel buyer, your safest, most reliable suppliers are right here at home. No one knows the needs of American steel buyers better than American steel makers. To serve you, and serve you well, is our primary concern—not just today and tomorrow—but year after year.

For quality steel of certified analysis, meeting the appropriate specifications, you can rely on Bethlehem Steel for such products as reinforcing bars, wire and wire products, pipe, structural shapes, plates, carbon bars . . . hot-rolled, cold-rolled, and galvanized sheets . . . transmission towers and other fabricated steel, wire rope, and industrial fasteners.

And remember, our engineers are on call to help you solve your steel-working problems.

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The IRON AGE

June 2, 1960—Vol. 185, No. 22

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News of the Industry

MAKING FOREMEN MANAGERS

Changes Are Needed—Today's foreman wants to "belong" to management. But often he lacks the needed tools of authority. New study shows what must be done to make foremen real managers. P. 23

AISI MEETING

New Approach — Steel leaders are taking a new approach to a new set of problems. Most believe that the worker holds the key. Failure to communicate with workers in the past may be remedied. P. 26

TIN CRISIS

Bolivian Showdown — Bolivia faces its greatest crisis since tin industry was 70 pct nationalized in 1952, as exports fall and costs mount. P. 28

COMPUTER SYSTEM

Automates Management — New IBM system handles six major management functions. These include sales forecasts, production scheduling and inventory control. System can even evaluate success of the entire operation. P. 29

ALUMINUM CASTINGS

Brilliant Finish—A company is getting brilliant anodized finishes, either clear or color, on aluminum

Metalworking

castings by using high-purity aluminum. P. 30

SOFT DRINK CANS

Growing Trend—Tinplate makers are keeping a close eye on the growing move to put more soft drinks in cans. P. 31

Engineering-Production Developments

LONGER FURNACE LIFE

From New Bricks—Two new refractory bricks do an excellent job of resisting attack from molten aluminum in the furnace. The result is greater amounts of high quality aluminum. The low silica contents of the bricks is one of the key factors of their success. Penetration is low, too. P. 64

BETTER ALUMINUM WELDS

Two Changes in Design—In the past, one of the biggest problems in the consumable arcwelding of aluminum has been "burnback." A new invention, an expandable contact tip, teams up with flat wire to reduce annoying downtime. This gives each operator another hour of welding time every day. P. 66

BRAZING AT HIGH HEATS

In a Furnace—A new resistance-type vacuum furnace determines the interstitial element in refractory metals. It operates at temperatures up to 4500°F and at pressures in the 0.1-micron range. The furnace has no nonmetallic refractories inside its vacuum chamber. P. 68

STRAIN GAGES

For High Temperatures — Turbine blades on a jet engine have to withstand 1700°F at speeds above 10,000 rpm. Ultra-thin, metal-foil strain gages combine with commutator design to provide the key to safe jet-aircraft flights. P. 72

CENTERLESS GRINDING

Of Precision Bearings—Centerless grinders in a new bearing plant make use of automatic gaging to meet tolerances as close as 0.000028 in. Some 758 gaging operations go into the production of one spherical roller bearing. P. 74

Market and Price Trends

AUTOMOTIVE

Launching a Comet—What are the problems in bringing out a new car—and doing it right? Mercury found out with its new compact Comet. And other automakers must solve many of the same problems soon. P. 39

MACHINE TOOLS

Minimum Wage—Dept. of Labor starts hearings that may lead to a minimum wage for machine tool builders. Walsh-Healy Act opens the door for establishment of minimum rate. One estimate: More than $2 per hour. P. 47

STEEL SUMMARY

Squeeze Coming?—Steel earnings may drop 15 to 20 pct this quarter. Companies may be in a squeeze between continuing rate of dividend payments and keeping up with capital spending plans. A third quarter slowdown in capital spending is likely. P. 99

PURCHASING

New Approach—DoAll Co. has integrated its purchasing department into its overall selling operation. The results: Lower costs and more efficient handling of inventories all distribution points. P. 100

Cover Feature

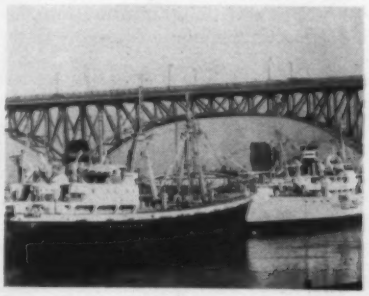
COVER FEATURE

Quick Results—What effects will certain additions have on blast furnace operations? Engineers like A. L. Hodge (left) and E. R. Wyczalek of Linde Co. can tell in minutes, using a computer. P. 61

NEXT WEEK

ST. LAWRENCE SEAWAY

Growing Pains—The St. Lawrence Seaway has yet to fulfill it's great potential. Ready to go this year, a strike of the Longshoremen hampered early shipments. Next week's special report covers some of the problems, analyzes its potential.



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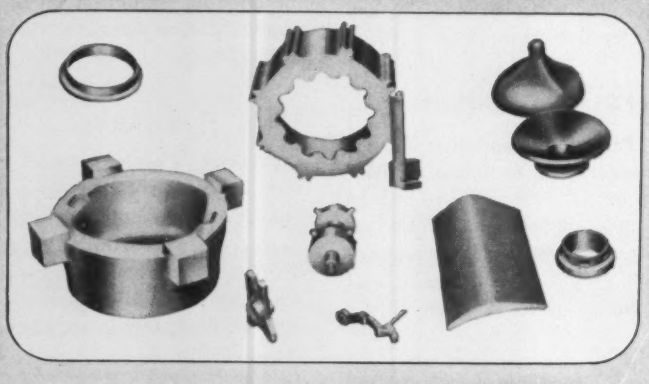

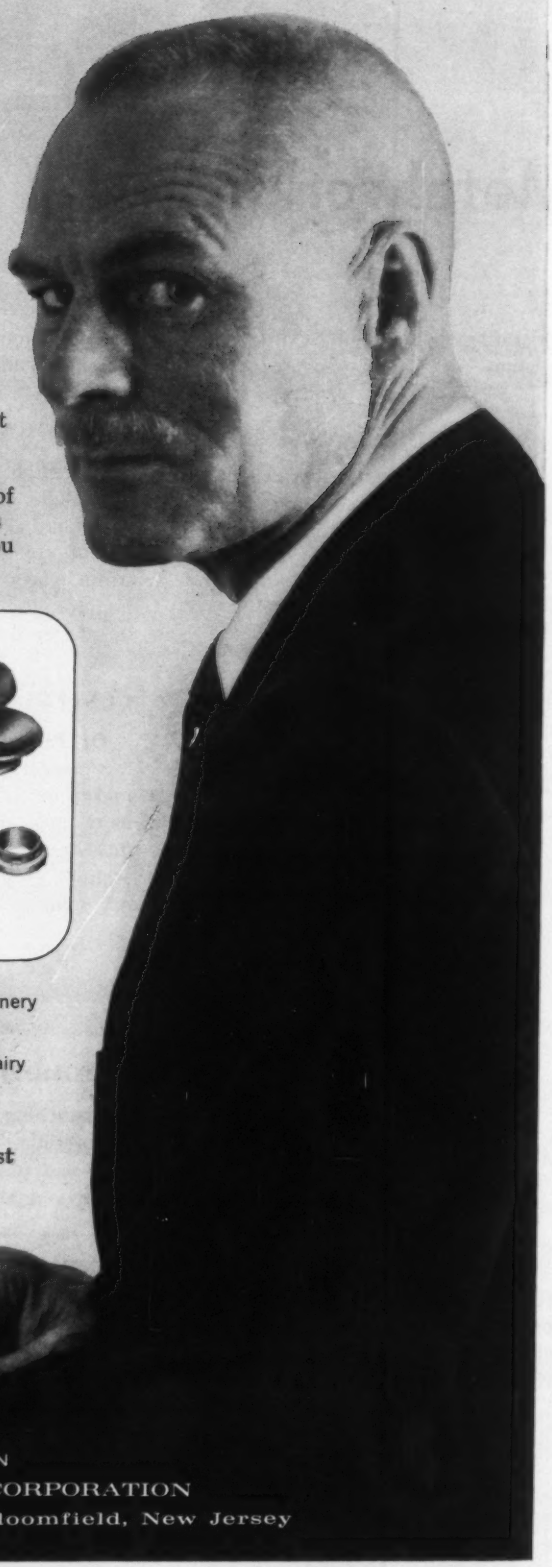

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IF EVER A BOLT CAME UP WITH THE ANSWERS— IT'S THIS ONE!

The Lamson High Strength Bearing Bolt is solving some of the oldest, meanest and costliest problems ever presented by steel connections.

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1. High Strength Bearing Bolts combine the tensile strength of High Strength Bolts with the bearing properties of rivets.
2. High Strength Bearing Bolts have the highest shear strength and greatest resistance to slip of all structural fasteners.
3. High Strength Bearing Bolts make possible important labor savings in fabrication and erection.
4. The High Strength Bearing Bolt assembly (bolt, nut, one washer) costs no more, grip for grip, than a High Strength Bolt assembly (bolt, nut, two washers).
5. High Strength Bearing Bolts (and Lamson High Strength Bolts) are available from every Steel Service Center of U.S.S. Supply Division, United States Steel Corporation.
6. High Strength Bearing Bolts are produced by Lamson & Sessions, a "major" in the fastener industry and a prime producer of structural fasteners since the turn of the century.

FOR PRICE AND DELIVERY INFORMATION: Contact any Steel Service Center of United States Steel Supply.

FOR ENGINEERING BULLETIN AND SAMPLE: Write The Lamson & Sessions Company, 5000 Tiedeman Road, Cleveland 9, Ohio.

For easy driving, the knurls are ball-shaped in front, relieved in back, set in a spiral pattern. In most grips, bolt can be placed in hole, then pulled through connection with torques well below final assembly torque. One man can install—no need to hold the head.

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METALOGICS AT WORK

How Ryerson helps stainless user cut costs

Production costs for a manufacturer of stainless steel fittings were high—and rising. Parts were being machined from 1-inch round, cold drawn Type 304. Its relatively slow machining speed made blanking, drilling, threading and roughing out slow and costly. Management considered that switching to 30% faster machining Type 303 would bring costs back in line. **A BETTER ANSWER:** this boost in machining rates looked like a good answer—but was it the *total* solution? With their Ryerson Representative they studied the problem further, and realized that service demanded of their fittings didn't require all the corrosion resistance of the 300 series. On the recommendation of Ryerson, they switched to Type 416 and gained *two* ways. It gave them a much higher machining rate—*100%* faster than type 304—*and* saved many dollars a ton in material costs.

There may be another stainless that will do *your* job faster, better, at lower cost. Ryerson offers *more* types, shapes, sizes, tonnage—and the knowledge of when and where to use them. Ryerson can handle your mill orders, too—saving you time and trouble at no additional cost.

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Mature Thinking: We Can Use a Lot of It!

No one who is mature will deny the value of self-analysis. But that quality is no reason or license for self-damage.

The cynics will say that there will be partisanship. They argue that all politicians will take advantage of the current debate on the U-2 and Summit results to torpedo their opponents.

We doubt all will. Of course, some will attempt to use the "debate" for political purposes. But those who do will rue the day.

There never was a better time than now for all people in both parties to give the President their support. Not to do so will play into the hand of Khrushchev and perhaps damage our country.

This does not mean we are not to have an accounting of what happened or did not happen at the Summit. That we will have. But it ought to be done so that the President is not put in a position where his power and leadership as head of our nation is imperiled.

Mr. Eisenhower has the support of the Democratic leaders in Congress. There is no attempt on their part to use fancied or real blunders as an excuse to demean the office of the President of the United States.

People in the President's own party would do well to rally around him as never before. It is the President who must wield the power and prestige of the United States. Others can't.

At no time should there even be a whisper of assent to downgrading the Presidency at a time when Mr. Eisenhower must counter all the wiles and dangers of Soviet action and reaction.

Certainly no one should ever be caught in the act of implying that he favors Khrushchev's shenanigans. Nor should any top leader of either party allow himself to be trapped into looking as though he favored the Reds.

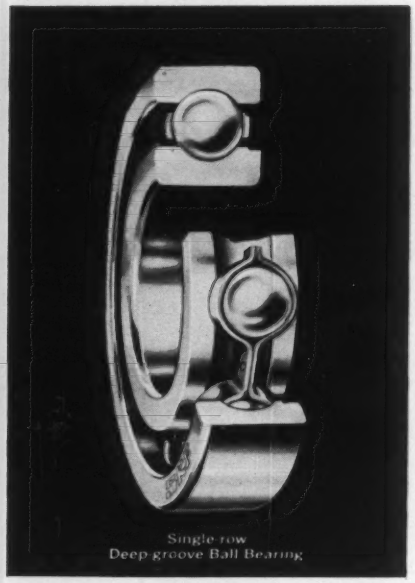
These are times that not only try men's souls; they are also times when lack of support for the nation's highest office could be catastrophic.

It is nonsense to say that human nature will reflect partisanship in our current troubles. That might apply in lesser cases. But when a Communist dictator suggests that he will await a softy in the Presidency to do business with, that is a signal.

And the signal is that we are Americans first and political partisans second. And that does not bar in the least a good go at self-examination.

Tom Campbell

Editor-in-Chief



Can a standard bearing offer you "more bearing" for your money?

It can if it's made by SKF—because all SKF bearings, both ball and roller, offer special qualities at "production" bearing prices.

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Yet this is a standard SKF ball bearing, mass-produced by automated production equipment at our plant at Altoona, Pa. You can quickly get this bearing in over 100 sizes, ranging from 5/8" to 15.748" O.D., and in a variety of seal, shield and snap-ring combinations.

But why not find out what SKF offers in bearing quality, availability and economy? Just call the SKF branch office nearest you.

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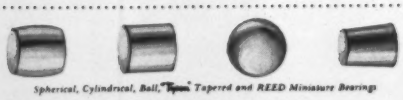
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Cobalt-60 Controls Furnace

Nuclear gaging may be the key to automatic control of blast furnaces. P. D. Johnson, Republic Steel Corp., states: "The blast furnace has proven that it can produce much more than was ever thought possible. In fact, the . . . peak performance is yet to come." Mr. Johnson says that a Cobalt-60 radiation system, in use by Republic, provides one method of reaching this goal.

Unit Speeds Heavy Castings

Just developed is a technique for automatically definning heavy castings. This marks a major advance in foundry technology. It transfers a laborious, dirty job from human hands to a high-speed machine. And it cuts production costs. First application will probably be on a 1961 compact car engine.

Silicon Aids Filtration

High heats and corrosive atmospheres no longer limit fabric filters in dust collecting applications. Bag-type collectors made of fiberglass, treated with silicones, operate at temperatures up to 600°F. Silicone treatment also makes it easier to clean the filter bags.

Measures Heat at 5072°F

Designed primarily for measuring steel temperatures in both openhearth and electric furnaces, a new refractory-metal thermocouple measures heats up to 5072°F. A transparent fused-silica tube protects the thermocouple's wires. A special metal cap that absorbs immersion shock protects the unit from slag and floating solids.

Nitriding Lowers Strength

Recent tests on the effects of nitriding titanium show that the nitride case continues to increase in thickness—following a parabolic relationship —with prolonged treatment. Nitriding a Ti-6A1-4V alloy, however, results in elongated grains. These grains extend down into the core and cause a reduction in impact strength. Results of these tests, conducted by the N.B.S., have been applied to aircraft-engine parts.

Ceramic-Coated Exhausts

Ceramic-coated exhaust systems will be installed on all 1961 Ramblers. Tests show that the new coating is fully resistant to emission acids, rust and salt. Dipping mufflers and tailpipes lets the ceramic cover both inner and outer surfaces. The coating fuses to the metal in a furnace at 1500°F. Then, asbestos insulation and a zinc-coated outer cover are applied to the muffler.

Reduces Refractory Damage

Tests by Canadian steelmakers prove the effectiveness of a new slag thinner. Called Sorelflux, the low-cost newcomer doesn't alter the properties of steels produced. Little corrosion at the slag line of the furnace and the ladle occurs. This reduction in refractory attack is a bonus—over and above the savings in costs.

Snap-Locks Secure Parts

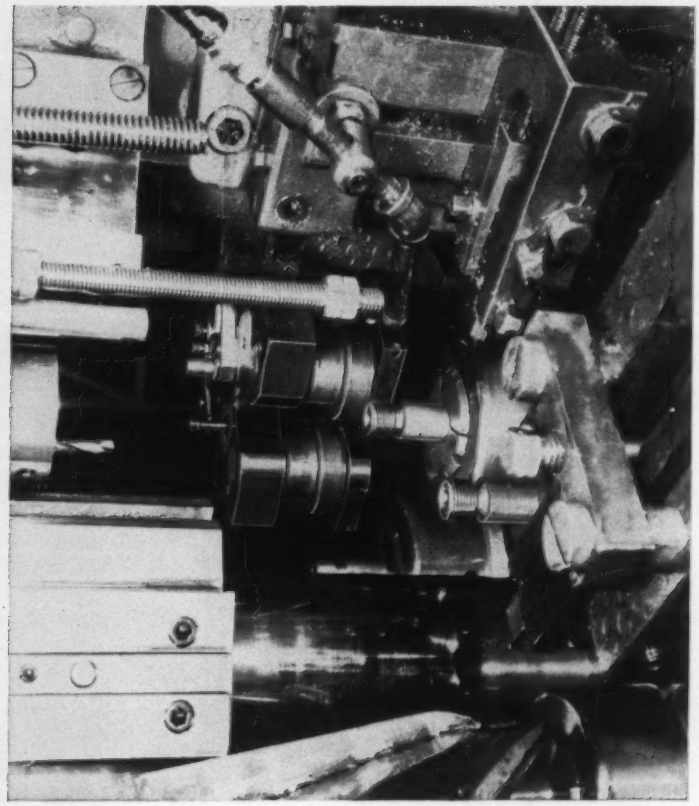
Aluminum extrusions with interconnecting features offer design engineers a fresh approach to construction. A series of these extrusions can be used to make almost any continuous flat or curved surface. Because the interconnecting feature is an integral part of each shape, riveting and welding aren't needed at the joints. The snap-lock extrusions form a joint that's as strong as the metal itself.

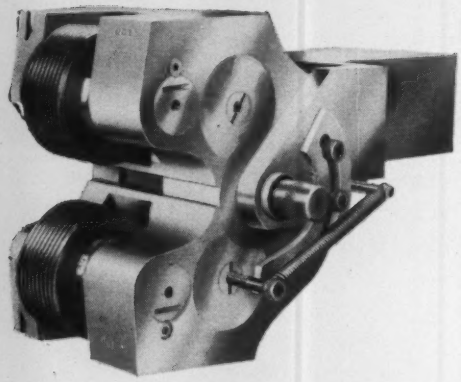
Long-Lived X-Ray Source

A long-lived source of X-rays in the 100-kv range meets use in the level, density and thickness gaging fields The active element is Sr-90-Y-90 which is distributed in a matrix of target material. This arrangement concentrates X-ray production in the desired range. The unit is doubly sealed by shielded arcwelding.

1/2" taper pipe thread rolled

with the LANROLL attachment





The recently developed LANDIS Method for precision rolling of taper pipe threads is shown at the Mac-It Parts Company, Lancaster, Pennsylvania, in the production of pipe plugs.

½" 14 pitch American Standard Taper Pipe threads are being rolled $\frac{9}{16}$" long to dry seal specifications on 4140 steel (207 Brinnell). The #22GA LANROLL Attachment (with a pipe range of ⅛" to 1") is used in the third position on a National Acme Bar Automatic—45,000 pieces are threaded with each set of rolls.

To produce the taper, the rolls of the LANROLL Attachment are supported on carbide shafts inclined to the required thread taper. This design enables the use of parallel rolls which reduces slippage between the workpiece and rolls. With reduced slippage, roll life is materially increased. In addition, attachment stabilization (limited sidewise movement) is greatly improved to permit rolling directly to a shoulder with safety.

By simply withdrawing the shank pin, the LANROLL Attachment can be removed to facilitate tooling changes and servicing without disturbing the original set-up. Other desirable features include the use of a gage to safely and precisely determine the attachment's tool slide location in respect to the high point of the machine's feed cam and the ability to use the same attachment to produce straight or taper threads through the use of proper rolls and a limited amount of auxiliary equipment.

For complete information on the LANDIS Method of rolling taper threads and other outstanding design principles, please write and request Bulletin G-96.

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LANDIS *Machine* COMPANY

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FATIGUE CRACKS

CAN This Happen?

Cans and competition for the can market have figured in metalworking news in the past few weeks. Last week we had a story on aluminum cans. This week we have a story on tin cans (p. 31).

There's no denying the importance cans—tin or aluminum—have in our daily life. They've been used to package just about everything—food, beverages, lubricants, and even clothing.

And many young husbands will agree it's no joke that a bride's best friend (and probably the husband's) is a can opener. In fact, the can opener has become so important that it has been motorized and now holds a prominent place on the kitchen wall or sinkboard.

Most of these electric can openers have a little magnet to hold the lid after the can has been opened. This has proved a boon to anyone who has experienced (and who hasn't) the messy task of fishing in the can to get out the top.

Now this leads to some interesting questions. Will aluminum cans make this most important feature obsolete? And if so, does this mean that we're headed towards dynamic obsolescence in this industry? Will the politicians take up the cry and promise TWO can openers on every wall? And what will happen if plastic containers become popular in the future?

Whatever happens, IRON AGE editors will be right on top of the developments, reporting them for our readers.

Psychological Viewpoint

One of our editors reports some interesting sidelights in a meeting with one of this country's leading industrial psychologists.

With the U-2 plane down deep inside Russia, but with the issue still hotly in the air, their conversation strayed to the incident during the course of the interview.

At His Elbow—The suggestion by the psychologist Dr. Frederick Gaudet, Stevens Institute of Technology, that caught the fancy of the editor: President Eisenhower should have a consulting psychologist in his entourage when he goes to powwows with "Mr. K." Along with economists, militarists, etc., Ike, says Dr. Gaudet, would do well to have a psychologist at his elbow when he deals with "the wiliest international fox and psychologist by instinct, Mr. K."

It makes a lot of sense to us.

To Look Older — Also, young executives who have older men working for them might take a practical psychological tip from the professor. Now clean shaven, he tells why he wore a beard years ago when he taught **IRON AGE** managing editor E. C. Beaudet. "At 30 I was a department head and had men 45 to 55 working in my department. To look more mature and a bit older, I grew the beard."

We don't know if your company allows beards, but if your problem is similar to the professor's and they don't, perhaps a Yul Brunner treatment might prove as effective.

Three Ring Story

Normally, the Opinion Research Corp. in Princeton, N. J. is a quiet, purposeful place. But something new was added the day our editor showed up to collect data for this week's Special Report (P. 23).

The added attraction: A circus setting up on a lot across the way. No efforts were made to study the motives or opinions of the assorted elephants, camels, and other circus animals. But it did lend an unusual note to the visit.

How ORC Operates — Opinion Research specializes in studies designed to help management make decisions and solve problems. It's a fully-integrated research company with a large staff of psychologists, socialogists, statisticians, economists and business administration experts.

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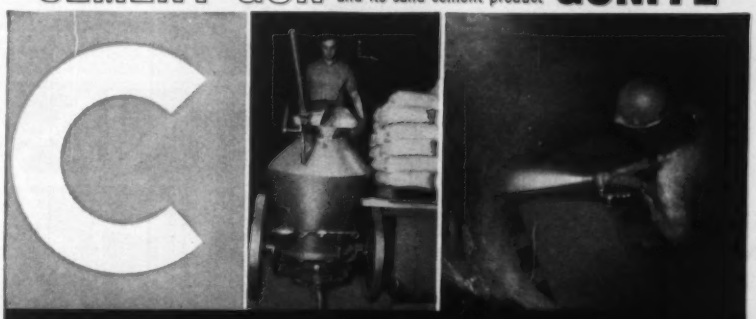

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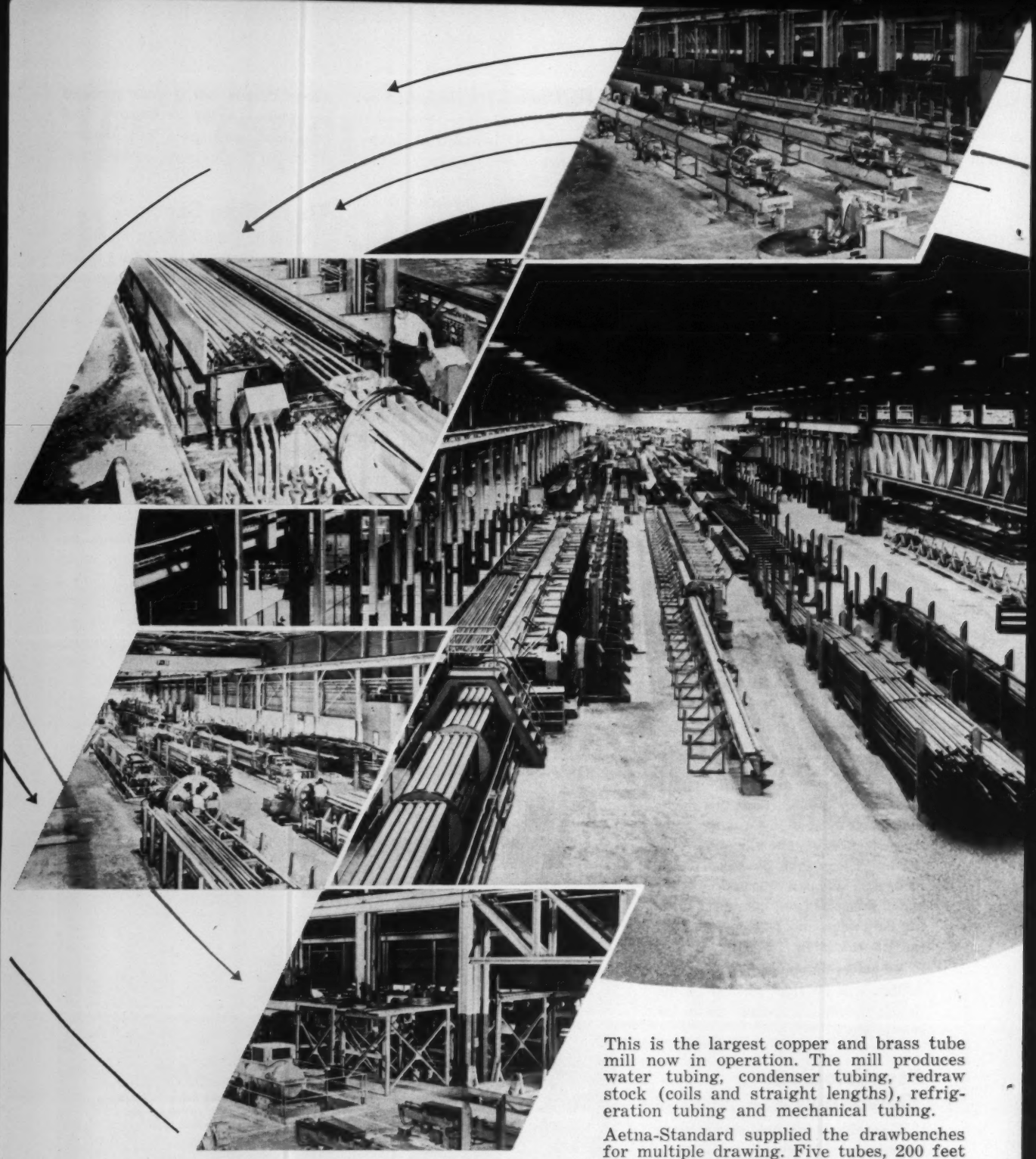

BRASS and COPPER TUBE MILL...

This is the largest copper and brass tube mill now in operation. The mill produces water tubing, condenser tubing, redraw stock (coils and straight lengths), refrigeration tubing and mechanical tubing.

Aetna-Standard supplied the drawbenches for multiple drawing. Five tubes, 200 feet in length, are drawn in a single pass. Aetna-Standard also supplied high speed 60-inch Bull Blocks with turn-style coil handling.

For information on Cold Draw equipment, write to: Aetna-Standard Division
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LETTERS FROM READERS

Centralized Engineering

Sir—We read your feature article entitled "Centralized Engineering Staff Puts Talent on Diverse Jobs," which appeared in the May 19 issue. We found this most interesting.

Will you please send us six reprints of this article.—R. H. Pipkorn, Chief Engr., Cleaver Brooks Co., Milwaukee, Wis.

▪ **Reprints are in the mail.—Ed.**

Floating Car

Sir—In the May 5 issue of The IRON AGE we saw a picture of a new German-built floating car which will be imported by the Amphicar Corporation of America, located in New York City.

Could you please give us the address of this company so that we can obtain more information on this car?—D. R. Mitchell, Pres., Mitchell-Bently Corp., Ionia, Mich.

▪ **Write to Amphicar Corp. of America, 680 5th Ave., New York 19, N. Y.—Ed.**

Work Wanted

Sir—I am a young man, 27-years-old, and a holder of a BS degree in mechanical engineering from the Mapua Institute of Technology (Philippine Republic). I finished my BSME in 1956 and passed the board examinations for mechanical engineers given that same year. Since then, I have been working, and at present am employed as an assistant engineer, in charge of the heat treat department and machine tool design, by a local firm primarily engaged in the manufacture of spare parts for crawler tractors.

I have always wanted to go to your country to pursue my studies in metallurgy, but due to financial difficulties my plans have never materialized. This is the reason I am writing to you to see if your office could help me find a company who is willing to engage the services of a foreign engineer, where I can work to help me pay my way through a U. S. engineering school. I firmly believe that the American people are always ready to extend their help for a just cause.

I would be very grateful if you could help me solve my problem.—Nestor B. Bongco, 1366 Quesada St., Tondo, Manila, Philippines.

▪ **Perhaps some of our readers can help.—Ed.**

Misplaced Decimal

Sir—Reference to T. M. Rohan's article "Trains, Boats are in Rate War." Next to last paragraph—Freight on 700,000 tons of pig iron at $3.60 per ton—come to $25.2 million. My slide rule says $2.52 million. Has my rule slipped a cog or is Mr. Rohan's calculation wrong?—N. T. Dixon, Pres., Cramberry Magnetite Corp., Cramberry, N. C.

▪ **Reader's right, should have been $2.52 million.—Ed.**

Industrial Design

Sir—Kindly send six copies of your article "How Industrial Design Affects the Total Marketing Effort" by Lippincott & Margulies for distribution among design students and professors of the University of Cincinnati.—S. C. Bloom, Cincinnati, O.

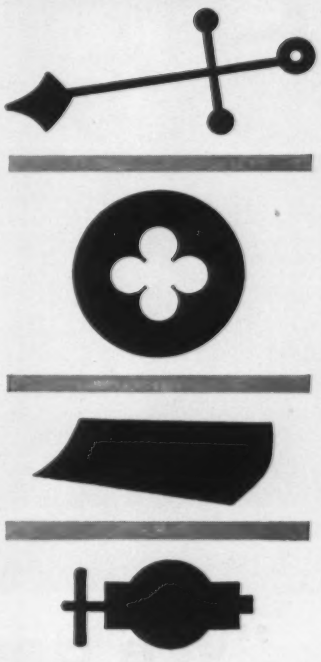
▪ **Copies are on the way.—Ed.**

"We feel it adds a touch of class to our cafeteria."

Maine Quiz #1

Can you identify these metal products produced in

MAINE?

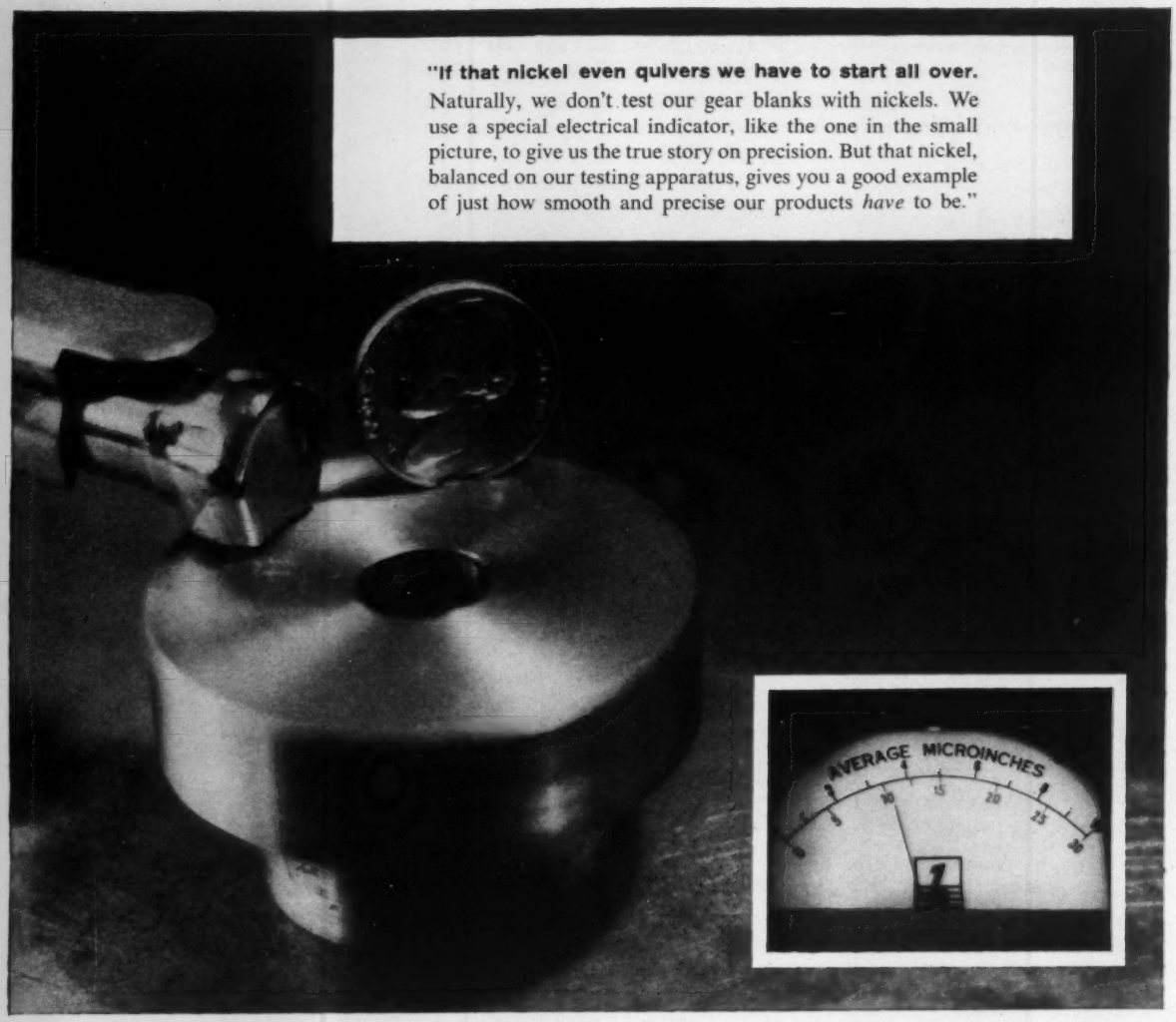


Answers — 1. Boat Anchor
2. Cutting Die, 3. Bulldozer Blade
4. Industrial Valve

Currently 150 metal working plants manufacturing machinery and ordnance parts, fabricated metal products, transportation equipment, and primary metal products are located in Maine. Over 5000 skilled workers produce thousands of machine tooled products daily.

Maine will produce the item of your choice. *Maine is the state for your new plant.* Write for our 56-page directory of the metal working industry in Maine and the *plan for 100% financing of new construction.*

Lloyd K. Allen, Commissioner
Maine Department
of Economic Development
State Capitol Augusta, Maine


"If that nickel even quivers we have to start all over.
Naturally, we don't test our gear blanks with nickels. We use a special electrical indicator, like the one in the small picture, to give us the true story on precision. But that nickel, balanced on our testing apparatus, gives you a good example of just how smooth and precise our products *have* to be."
AVERAGE MICROINCHES

"We depend on Cities Service for absolute precision!"

Lester E. Hoffmann, Treasurer and Vice-President
American Screw Machine Products Co., Chicago, Ill.

"The screw machine business is a highly competitive trade. We've built our business and our reputation on top quality, high-precision products . . . gear blanks that require the closest tolerances in *all* aspects. That means *we have to have* the best-quality cutting oil available. We've depended on Cities Service for nearly 25 years and they've never let us down."

"Matter of fact," says Mr. Hoffmann, "they insisted we try other brands just to prove that Cities Service was the best for us. They proved their point. We've stuck with Cities Service."

At the present time, American Screw Machine Products Co. is using Cities Service CHILLO 10 Cutting oil, and some CHILLO 22. As Mr. Hoffmann says, "The sulphur and chlorine additives prevent welding and galling action which allows for fine finishes and long tool life that maintains high-precision, top-quality work."

If you use petroleum products in your operations, why not talk with your Cities Service Lubrication Engineer? He can help you get the most from your operations by giving you the finest products, the best service available. Or if you prefer, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

COMING EXHIBITS

New England Material Handling Show—June 6-8, Commonwealth Armory, Boston. (Material Handling Institute, One Gateway Center, Pittsburgh 22.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

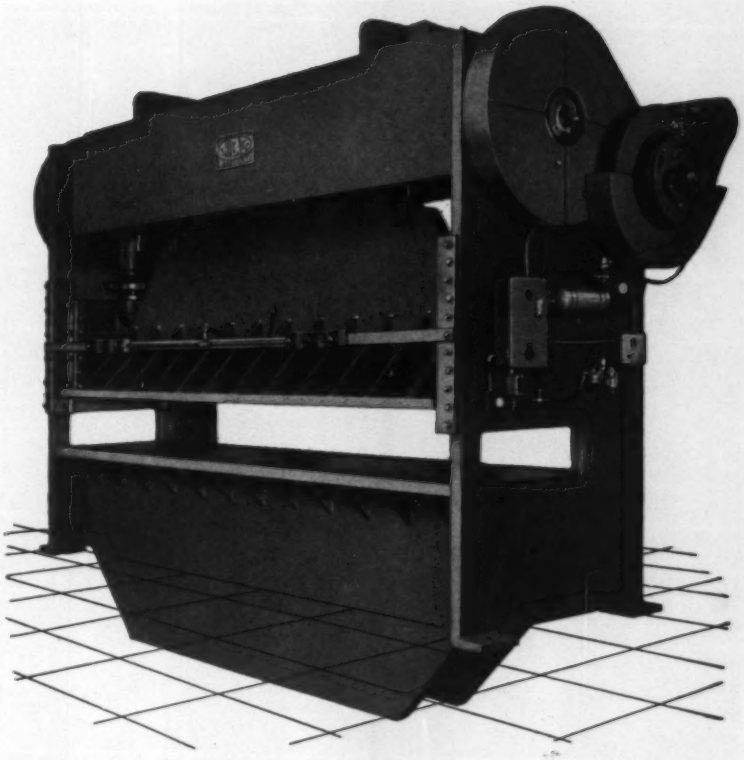
JUNE

The Industrial Wire Cloth Institute—Annual resort meeting, June 3-7, Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 630 Third Ave., New York.

The American Society of Mechanical Engineers—Semi-annual meeting, June 5-9, Statler-Hilton, Dallas. Society headquarters, 29 W. 39th St., New York.

Malleable Founders Society — Annual meeting, June 6-8, Elbow Beach Surf Club, Hamilton, Bermuda. Society headquarters, 781 Union Commerce Bldg., Cleveland.

(Continued on P. 16)



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STRAIGHT-SIDE TYPE

large die area

capacities up to 400 tons

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

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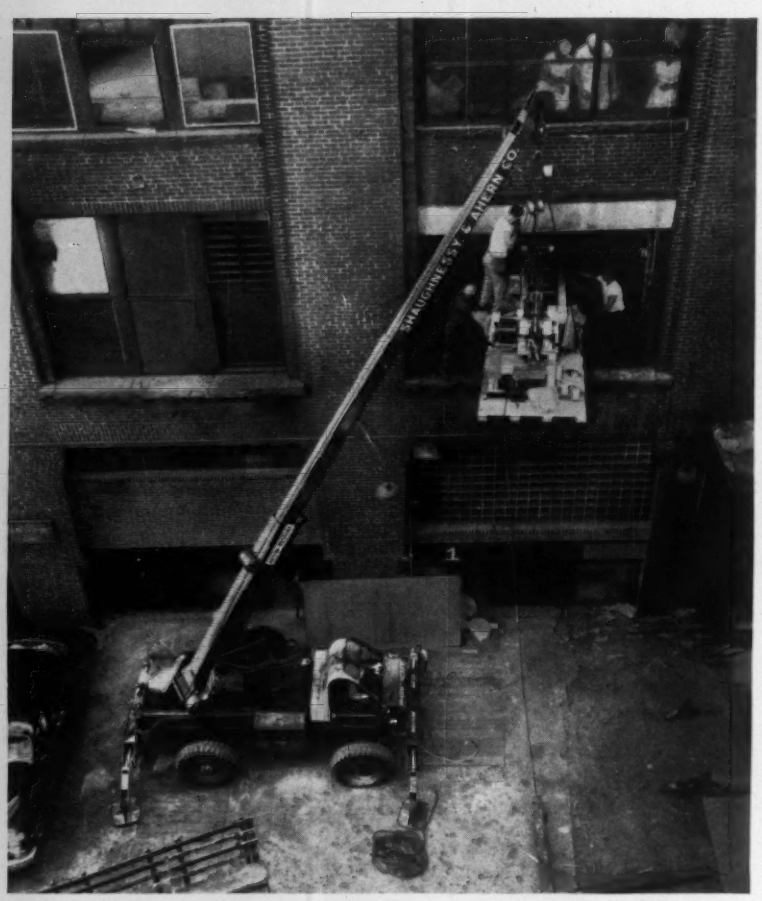

Model 210 A-W Hydraulic Crane hoists 5600-lb. packaging machine to second story of Boston bakery.

A-W crane doubles riggers' capacity!

"Our Austin-Western hydraulic crane serves two or three rigging crews daily, 6 days a week, in different parts of the city. It has plenty of speed and mobility for heavy traffic. Our records show that it actually doubles the work capacity of our crews. Customers like it too. They often request it because it works faster and more efficiently and as a result costs them less hourly rental.

Fantastically low maintenance

"The A-W is versatile. It frequently does jobs which used to take a heavier crane renting for $150 a day. Maintenance costs have been fantastically low. Downtime near zero. It's an easy-to-operate piece of precision equipment; tops for dependability and performance. Only one man is required to operate this crane. I don't see how we could do business without it any more"—*Jack Shaughnessy, Shaughnessy and Ahern, Boston machinery movers and riggers.*

To lift, carry or place

Austin-Western now offers a complete line of lift, carry and place equipment in five models with capacity ranges from 5 to 11 tons. Chances are good that an A-W hydraulic crane will save time and money for you in your operations. Why not let us tell you exactly how much you could expect to save with one. Ask your nearby Austin-Western distributor or write us today.

Austin-Western

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BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

MEETINGS

American Gear Mfrs. Assn.—Annual meeting, June 6-8, The Homestead, Hot Springs, Va. Association headquarters, One Thomas Circle, Washington 5, D. C.

Edison Electric Institute — Annual convention, June 6-8, Atlantic City, N. J. Institute headquarters, 420 Lexington Ave., New York.

Institute of Appliance Mfrs.—Annual convention, June 6-9, Netherland-Hilton, Cincinnati. Institute headquarters, Shoreham Hotel, Washington 8, D. C.

Wire Assn. — Regional meeting, June 7-8, Statler Hotel, Los Angeles. Association headquarters, 453 Main St., Stamford, Conn.

Metal Powder Industries Federation—International powder metallurgy conference, June 13-15, Biltmore Hotel, New York. Headquarters, 60 East 42nd St., New York 17, N. Y.

Alloy Casting Institute — Annual meeting, June 19-21, The Homestead, Hot Springs, Va. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

Industrial Safety Equipment Assn., Inc.—Annual meeting, June 21-24, Sedgefield Inn, Greensboro, N. C. Association headquarters, 420 Lexington Ave., New York.

Steel Tank Institute—Semi-annual meeting, June 23-24 Broadmoor, Colorado Springs, Colo. Institute headquarters, 120 S. LaSalle St., Chicago.

Drop Forging Assn.—Annual meeting of members, June 26-29, Seigniory Club, Canada. Association headquarters, 1121 Illuminating Bldg., Cleveland.

Gregory Grant says —

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MAKE YOUR OWN COMPARISON . . .
CALL ANDREW 8-4409 COLLECT

Here is a typical comparison — 50 sets of gears and pinions to meet assembly specifications:

Set of stock gears unaltered	$20.20	Set of Grant customized gears to your specifications, ready for installation $15.75 pair
Rebore shaft hole/per pr.	.80	
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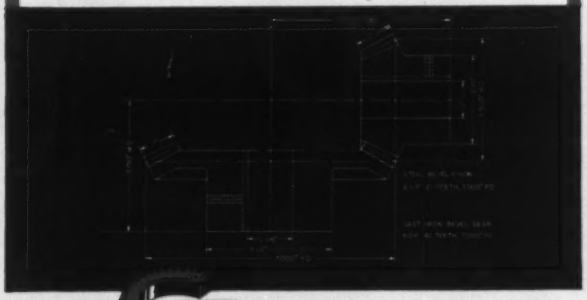
Drill and tap for set screw/per pr.	.40	
	$21.90 pair	



We believe we can prove on your next O.E.M. application that you can save 25% in actual costs when you specify Grant *customized* gears, instead of making time-consuming alterations to stock gears to fit your needs.

So call us — collect — we will gladly quote on your needs, no obligation, of course.

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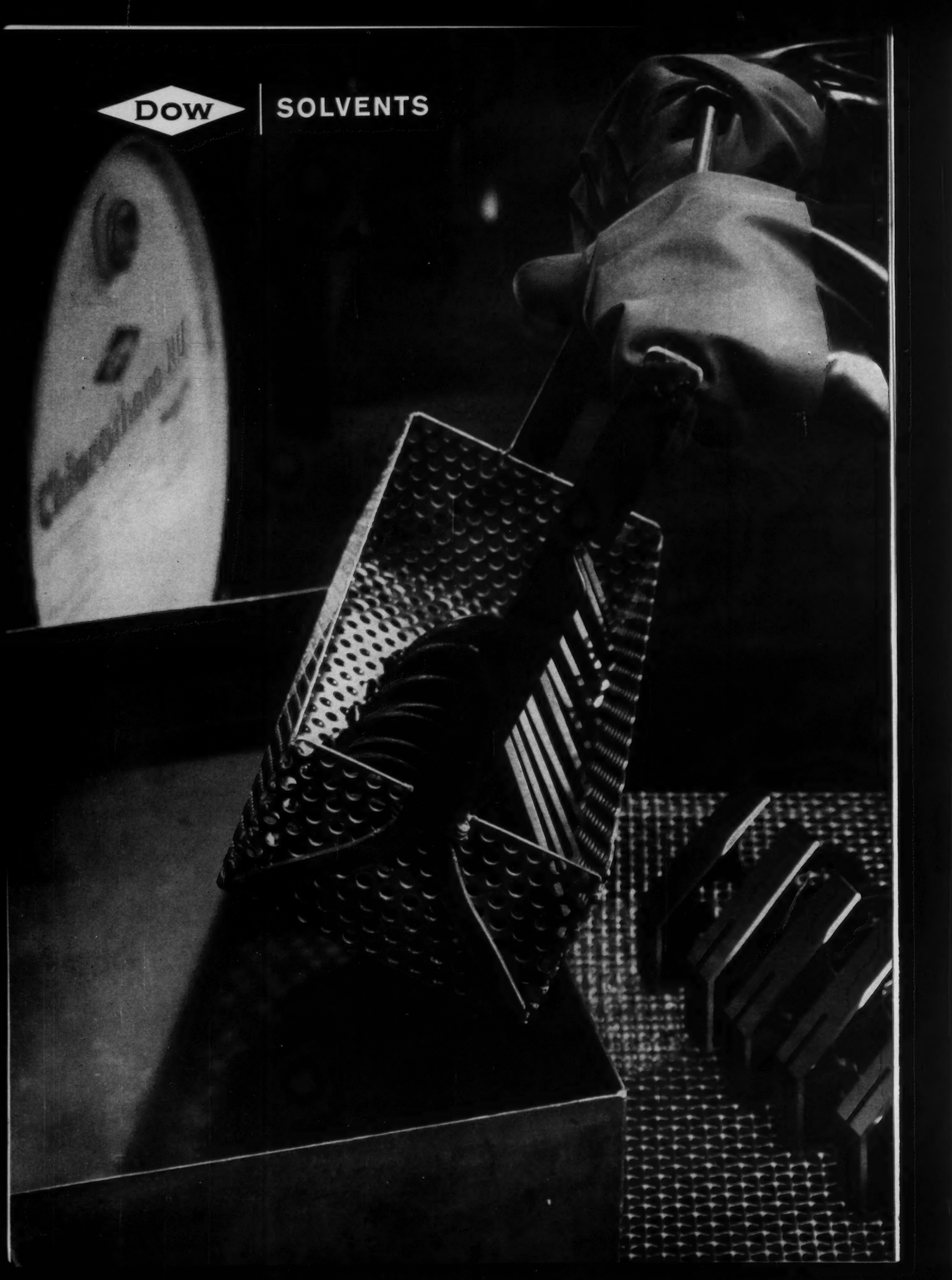
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ANNOUNCING...

Chlorothene NU

New stabilizer system solves corrosion problems—makes recovery easy!

Newly developed Chlorothene® NU combines high solvency and safety with an advanced stabilizer system that makes possible an extraordinary range of cold-cleaning applications – makes recovery easy, too!

The exceptional stability of Chlorothene NU (specially inhibited 1,1,1-trichloroethane) practically eliminates corrosion of sensitive metals. You can use it for cleaning aluminum, zinc, and white-metal alloys–as well as other metals, many plastics, rubber products and other materials.

Because increased stability makes recovery easy and practical, you can enjoy the economy of using Chlorothene NU over and over again. In most cases, existing equipment, such as a trichloroethylene still, does an excellent job.

Safe two ways! Low in toxicity, Chlorothene NU has a maximum allowable vapor concentration of 500 parts per million. That's closely comparable to many flammable solvents and is substantially more favorable than most chlorinated solvents. In addition, Chlorothene NU has no fire or flash point, as measured by standard methods. These features not only make Chlorothene NU safer to use–they simplify new cleaning systems and waste disposal.

COLOR CODED –For easy identification, even from 100 feet away, drums of Chlorothene NU are distinctively color-coded in green and white. For more information about Chlorothene NU, call your distributor of Dow solvents. He knows all about its use, recovery and comparative cost. Or contact your nearest Dow sales office.

THE RIGHT SOLVENT FOR THOUSANDS OF INDUSTRIAL USES. Not only is Chlorothene NU recommended for cold-cleaning dip operations on the production line—it also cleans by spray, bucket or wipe methods. It's an all-purpose solvent for many applications, both on the production line and for maintenance use.

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The widest line of industrial solvents: Trichloroethylene, Perchloroethylene, Methylene Chloride, Chlorothene NU.

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BIRMINGHAM—Wittichen Chemical Company **(C M P)**
BIRMINGHAM—F. H. Ross & Company, Inc. **(C M P)**
MOBILE—McKesson & Robbins, Inc. **(C M P T)**
MOBILE—F. H. Ross & Company, Inc. **(C M)**
MONTGOMERY—Wittichen Chemical Company **(C M P)**

ARIZONA
PHOENIX—Braun Chemical Company **(C M P T)**
PHOENIX—Western Chemical Company **(C M P)**
TUCSON—Western Chemical Company **(C M P)**

CALIFORNIA
LOS ANGELES—Braun Chemical Company **(C M P T)**
LOS ANGELES—McKesson, Mefford Chemical Division **(P)**
LOS ANGELES—Pemaco, Inc. **(P T)**
SAN DIEGO—Braun Chemical Company **(C M P T)**
SAN FRANCISCO—Braun-Knecht-Heimann Co. **(C M P T)**
SAN FRANCISCO—G. N. Meacham Company **(C)**

COLORADO
DENVER—Braun-Knecht-Heimann Company **(C M)**
DENVER—Chemical Sales Company **(C M P T)**
DENVER—McKesson & Robbins, Inc. **(C M P T)**
DENVER—Mine and Smelter Supply Company **(C M P T)**
GRAND JUNCTION—C. D. Smith Co., Chemical Div. **(C P T)**

CONNECTICUT
HARTFORD—Dwight R. Judson Company **(C T)**
NEW HAVEN—H. Krevit and Company, Inc. **(C P T)**
SHELTON—Axton-Cross Company **(C M P T)**
SOUTH NORWALK—Guard-All Chemical Co. **(C M P T)**
STAMFORD—McKesson & Robbins, Inc. **(C M P)**
WATERBURY—Hubbard Hall Chemical Company **(M)**

FLORIDA
JACKSONVILLE—F. H. Ross & Company, Inc. **(C M P)**
JACKSONVILLE—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Biscayne Chemical Laboratories **(C M P)**
ORLANDO—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—Amica Burnett Chemical Co. **(C M P T)**
TAMPA—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—McKesson & Robbins, Inc. **(C M P T)**

GEORGIA
ATLANTA—Chapman Chemical Company **(T)**
ATLANTA—McKesson & Robbins, Inc. **(C M P T)**
ATLANTA—F. H. Ross & Company, Inc. **(C M P)**
ATLANTA—Southern States Chemical Co. **(C M P T)**
BIRMINGHAM—Chapman Chemical Company **(T)**
COLUMBUS—F. H. Ross & Company, Inc. **(C M P)**
DUBLIN—Textile Aniline Chemical Company **(T)**

IDAHO
BOISE—Van Waters & Rogers, Inc. **(C M P)**

ILLINOIS
AURORA—River Valley Chemicals, Inc. **(C M P T)**
CHICAGO—Central Solvents & Chemicals Co. **(C M P)**
CHICAGO—C. P. Hall Company of Illinois **(C M P T)**
CHICAGO—McKesson & Robbins, Inc. **(C M P T)**
CHICAGO—Joseph Turner & Company **(C M P T)**
DECATUR—McKesson & Robbins, Inc. **(C M P T)**
EFFINGHAM—Wabash Independent Oil Company **(C P T)**
MELROSE PARK—London Chemical Company, Inc. **(P T)**
PEORIA—McKesson & Robbins, Inc. **(C M P T)**
ROCKFORD—Industrial Oil & Chemical Company **(C)**
ROCKFORD—Viking Chemical Company **(C M P T)**

INDIANA
EVANSVILLE—Barning Industrial Chemicals, Inc. **(C M P T)**
EVANSVILLE—Charles Leich and Company **(P)**
FT. WAYNE—Hoosier Solvents & Chemicals Corp. **(C M P)**
FT. WAYNE—Inland Chemical Corporation **(C M P)**
HAMMOND—Inland Chemical Corporation **(C M P T)**
INDIANAPOLIS—Hoosier Solvents & Chemicals Corp. **(C M P)**
INDIANAPOLIS—Wm. Lynn Chemical Co., Inc. **(C M P)**
INDIANAPOLIS—Ulrich Chemical Company, Inc. **(C T)**
KOKOMO—Plating Products, Inc. **(T)**
LOGANSPORT—Plating Products, Inc. **(T)**
SOUTH BEND—Inland Chemical Corporation **(C M P T)**
SOUTH BEND—Stevens Company **(C M P)**

IOWA
BETTENDORF—Barton Naphtha Corporation **(C M P)**
BURLINGTON—McKesson & Robbins, Inc. **(C M P T)**
CEDAR RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
COUNCIL BLUFFS—Barton Solvents Co. **(C M P T)**
DAVENPORT—McKesson & Robbins, Inc. **(C M P T)**
DES MOINES—Barton Naphtha Company **(C M P T)**
SUMNER—Overton Chemical Sales **(C)**

KANSAS
WICHITA—McKesson & Robbins, Inc. **(C M)**

KENTUCKY
LOUISVILLE—Dixie Solvents and Chemicals Co. **(C M P)**
LOUISVILLE—Gans Chemical and Supply Company **(P)**
LOUISVILLE—McKesson & Robbins, Inc. **(C M P T)**

LOUISIANA
BATON ROUGE—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—Southern Solvents and Chemicals **(C M P T)**

MAINE
LEWISTON—Polar Chemical Company **(C M P T)**

MARYLAND
BALTIMORE—Leidy Chemicals Corporation **(C M P)**
BALTIMORE—Seiler-Hughes Chemicals, Inc. **(C)**
BALTIMORE—Tilley Chemical Company **(T)**

MASSACHUSETTS
BOSTON—Howe and French, Inc. **(C M)**
BOSTON—Linder and Company, Inc. **(C M P T)**
BOSTON—McKesson & Robbins, Inc. **(C M P T)**
EVERETT—Sessions-Gifford Co., Inc. **(C M P T)**
FRAMINGHAM—Axton-Cross Corp. of Mass. **(C P T)**
HINGHAM—Stephen-Roger, Inc. **(C M P T)**
SPRINGFIELD—Chemical Corporation **(C M P T)**
SPRINGFIELD—Hampden Color & Chem. Co. **(C M P)**
STONEHAM—George Mann & Company, Inc. **(C M P T)**
WESTFIELD—Eastern Chemicals, Inc. **(M)**
WORCESTER—George H. Clark and Co. **(C M P T)**

MICHIGAN
DETROIT—Eaton Chemical & Dyestuff Company **(C M)**
DETROIT—Manpro Corporation **(C M P T)**
DETROIT—McKesson & Robbins, Inc. **(C M P T)**
DETROIT—Western Solvents & Chemicals Company **(C M P)**
DETROIT—Whitfield Chemical Company **(P)**
ESCANABA—Haviland Products Company **(C M P)**
FERNDALE—Manpro Corporation **(C M P T)**
GRAND RAPIDS—Haviland Products Company **(C M P)**
GRAND RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
GRAND RAPIDS—Wolverine Solvents & Chemicals Co. **(C M P)**
LANSING—Carrier Stephens Company **(C M P)**
LANSING—Wheaton Chemical Company **(C P)**
SAGINAW—McKesson & Robbins, Inc. **(C M P T)**

MINNESOTA
MINNEAPOLIS—W. H. Barber Company **(P T)**
MINNEAPOLIS—McKesson & Robbins, Inc. **(C M P T)**
ST. PAUL—Lyons Chemicals, Inc. **(C M P)**

MISSISSIPPI
JACKSON—F. H. Ross & Company, Inc. **(C M P)**

MISSOURI
KANSAS CITY—McKesson & Robbins, Inc. **(C M)**
KANSAS CITY—Missouri Solvents and Chemicals Co. **(C M P)**
KANSAS CITY—Sherwood and Company, Inc. **(C M P T)**
ST. LOUIS—McKesson & Robbins, Inc. **(C M P T)**
ST. LOUIS—Independent Oil Company **(C M P T)**
ST. LOUIS—G. S. Robins and Company **(C M P)**
ST. LOUIS—Missouri Solvents and Chemicals Co. **(C M P)**

NEBRASKA
OMAHA—Barton Solvents Company **(C M P T)**
OMAHA—McKesson & Robbins, Inc. **(C M P T)**

NEW JERSEY
BLOOMFIELD—McKesson & Robbins, Inc. **(C M P)**
CAMDEN—Callahan Chemical Company **(C M P T)**
EAST PATERSON—Aetna Chemical Corp. **(C M P T)**
MURRAY HILL—American Mineral Spirits Co. **(C M P T)**
NEWARK—American Oil and Supply Co. **(C P)**
NEWARK—National Oil and Supply Company **(C M P T)**
PALISADES PARK—Philip A. Hunt Company **(C)**
PERTH AMBOY—Modern Solvents & Chemicals Corp. **(M P T)**
RIVERDALE—A. H. Mathieu Company **(P)**
SOUTH KEARNY—American Chemicals, Inc. **(C M P T)**
VINELAND—Lirio Chemical Company **(C P T)**

NEW MEXICO
ALBUQUERQUE—Braun Chemical Company **(C M P T)**
ALBUQUERQUE—Edmunds Chemical Company **(C M P T)**

NEW YORK
ALBANY—Krackler & Campbell, Inc. **(M)**
ATHENS—Spick Products Company **(P T)**
BINGHAMTON—Collier Chemicals, Inc. **(P T)**
BRONX—Elco Solvents Corporation **(M P T)**
BROOKLYN—Enequist Chemical Company **(C P)**
BUFFALO—Buffalo Solvents and Chemicals **(C M P)**
BUFFALO—Chemical Sales Corporation **(C M P T)**
BUFFALO—McKesson & Robbins, Inc. **(C M P T)**
GARDEN CITY—Hogan Industrial Supply Corp. **(C M P T)**
GLOVERSVILLE—Eastern Chemicals, Inc., S. H. Ireland Div. **(C M)**
KEARNY—American Chemicals, Inc. **(C M P T)**
LONG ISLAND CITY—Peerless Oil and Chemical Corp. **(C M P T)**
NEW YORK—American Chemicals, Inc. **(C M P T)**
NEW YORK—McKesson & Robbins, Inc. **(C M P)**
POUGHKEEPSIE—Duso Chemical Company **(C)**
RENSSELAER—Eastern Chemicals, Inc. **(C M)**
ROCHESTER—Chemical Sales Corporation **(C M P T)**
SYRACUSE—Eastern Chemicals, Inc. **(C M)**
UTICA—Monarch Laboratories **(C M P)**

NORTH CAROLINA
CHARLOTTE—F. H. Ross & Company, Inc. **(C M)**
CHARLOTTE—Moreland Chemical Company **(C M P T)**
CHARLOTTE—Southern States Chemical Co. **(C M P T)**
GREENSBORO—F. H. Ross & Company, Inc. **(C M)**

OHIO
AKRON—Farley Solvents Company **(C M P T)**
AKRON—C. P. Hall Company **(C M P T)**
CANTON—Bison Corporation **(C M P)**
CINCINNATI—Amsco Solvents and Chemicals Co. **(C M P)**
CINCINNATI—Chipman Supply Company **(T)**
CINCINNATI—Herbert Chemical Company **(P T)**
CINCINNATI—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—Man-Gill Chemical Company **(C P T)**
CLEVELAND—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—National Solvents Corporation **(C P T)**
CLEVELAND—Ohio Solvents and Chemicals, Inc. **(C M P)**
CLEVELAND—R. W. Renton Company **(C P T)**
COLUMBUS—McKesson & Robbins, Inc. **(C M P T)**
DAYTON—Industrial Chemical Products Co. **(C P T)**
DAYTON—Ottoson Solvents, Inc. **(T)**
LIMA—Thomson Chemical Company **(C M P T)**
TOLEDO—Inland Chemical Co. **(C M P)**
TOLEDO—Toledo Solvents and Chemicals **(C M P)**
TOLEDO—M. I. Wilcox Company **(C P T)**
YOUNGSTOWN—Rhiel Supply Company **(C M P T)**

OKLAHOMA
OKLAHOMA CITY—McKesson & Robbins, Inc. **(C M P T)**
TULSA—McKesson & Robbins, Inc. **(C M P T)**
TULSA—Chemical Products, Inc. **(C M P T)**

OREGON
PORTLAND—Van Waters & Rogers, Inc. **(C M P)**

PENNSYLVANIA
CONSHOHOCKEN—American Mineral Spirits Co. **(C M P T)**
EASTON—Lehigh Valley Chemical Company **(C M P T)**
ERIE—Monarch Laboratories **(T)**
LEESPORT—R. W. Eaken, Inc. **(C M P T)**
McKEES ROCKS—Apex Soap and Sanitary Corp. **(C P T)**
PHILADELPHIA—Alex C. Fergusson Company **(C P T)**
PHILADELPHIA—McKesson & Robbins, Inc. **(C M P T)**
PHILADELPHIA—Phillips and Jacobs, Inc. **(C M)**
PHILADELPHIA—Pioneer Salt Company **(C M P T)**
PHILADELPHIA—George Senn, Inc. **(C M P T)**
PITTSBURGH—Carmac Chemical Company, Inc. **(C P)**
PITTSBURGH—Carman-Pittsburgh Company, Inc. **(C)**
PITTSBURGH—Ft. Pitt Chemical Company **(C)**
PITTSBURGH—McKesson & Robbins, Inc. **(C M P T)**
READING—Textile Chemical Company **(C P)**
SCRANTON—Scranton Chemical Company **(C P T)**
YORK—Industrial Solvents and Chemicals Co. **(C P T)**

RHODE ISLAND
CRANSTON—Giffordline Chemical Company **(C M P T)**
PROVIDENCE—George Mann & Company, Inc. **(C M P T)**
PROVIDENCE—Sessions-Gifford Company, Inc. **(C M P T)**

SOUTH CAROLINA
CHARLESTON—Burris Chemical Company **(C P T)**
GREENVILLE—F. H. Ross & Company, Inc. **(C M)**
GREENVILLE—Southern States Chemical Co. **(C M P T)**
SPARTANBURG—Moreland Chemical Co., Inc. **(C M P T)**

TENNESSEE
CHATTANOOGA—Chapman Chemical Co. **(C M P T)**
CHATTANOOGA—Wilson Sales Company **(C M P T)**
KINGSPORT—Chem-I-Dent, Inc. **(C P T)**
MEMPHIS—Chapman Chemical Company **(C M P T)**
MEMPHIS—C. P. Hall Company **(C M P T)**
MEMPHIS—Ideal Chemical and Supply Co. **(C M P T)**
NASHVILLE—Chapman Chemical Company **(C M P T)**
NASHVILLE—Wilson Sales Company **(C M P T)**

TEXAS
AMARILLO—State Chemical Company **(C M P T)**
AUSTIN—R. M. Hughes Company, Inc. **(C M P T)**
BEAUMONT—Arthur Dooley and Son **(C M P T)**
CORPUS CHRISTI—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—Texas Solvents and Chemicals Co. **(C)**
DALLAS—Van Waters and Rogers, Inc. **(C M P T)**
EL PASO—Baron Chemical Company **(C M P T)**
EL PASO—Braun Chemical Company **(C M P T)**
EL PASO—Mine and Smelter Supply Company **(P)**
FORT WORTH—McKesson & Robbins, Inc. **(C M P T)**
HOUSTON—McKesson & Robbins, Inc. **(C M P T)**
HOUSTON—W. H. Curtin and Company **(P)**
HOUSTON—Dixie Chemical Company **(C M P T)**
HOUSTON—R. M. Hughes Company, Inc. **(C M P T)**
HOUSTON—Texas Solvents and Chemicals Co. **(C M P)**
HOUSTON—Van Waters and Rogers, Inc. **(C M P T)**
LUBBOCK—State Chemical Company **(C M P T)**
MIDLAND—State Chemical Company **(C M P T)**
ODESSA—McKesson & Robbins, Inc. **(C M P T)**
SAN ANTONIO—R. M. Hughes Company, Inc. **(C M P T)**
SAN ANTONIO—McKesson & Robbins, Inc. **(C M P T)**
TERMINAL—State Chemical Company **(C M P T)**

UTAH
SALT LAKE CITY—Braun-Knecht-Heimann Co. **(C M P T)**

VIRGINIA
RICHMOND—Phipps and Bird, Inc. **(C M P T)**
ROANOKE—Havnaer Supply Company **(C M P T)**

WASHINGTON
SEATTLE—Van Waters & Rogers, Inc. **(C M P)**
SPOKANE—Van Waters & Rogers, Inc. **(C M P)**

WEST VIRGINIA
BLUEFIELD—Fairmont Supply Co. **(T)**
CHARLESTON—B. Preiser Company, Inc. **(C M P T)**
FAIRMONT—Fairmont Supply Company **(C P T)**
HUNTINGTON—Cabell Chemical Company **(C P T)**

WISCONSIN
APPLETON—McKesson & Robbins, Inc. **(C M P T)**
CHIPPEWA FALLS—Lyon Chemicals Co., Inc. **(C M P)**
LA CROSSE—North Central Chemicals, Inc. **(C M P T)**
LA CROSSE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
MADISON—North Central Chemicals, Inc. **(C M P T)**
MILWAUKEE—Benlo Industrial Chemicals Company **(P T)**
MILWAUKEE—McKesson & Robbins, Inc. **(C M P T)**
MILWAUKEE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
WAUKESHA—F. P. Jay Chemicals, Inc. **(C M T)**

See Your Distributor of Dow Solvents First!

THE BATTLE FOR THE CAN MARKET continues as "thin tin" men indicate demand is mounting at a rate that may soon force a decision on commercial production facilities. Strong interest is shown by can makers--and by prospective users far afield from containers. Meanwhile, a major aluminum company is reportedly ready to unveil a secret weapon in the can war this summer.

NO INVENTORY BUILD-UP IS FORESEEN by purchasing agents. The Business Survey Committee of the National Association of Purchasing Agents reports that 36 pct of their members say they have definite plans to further reduce their inventories. Only 6 pct look to stock increases.

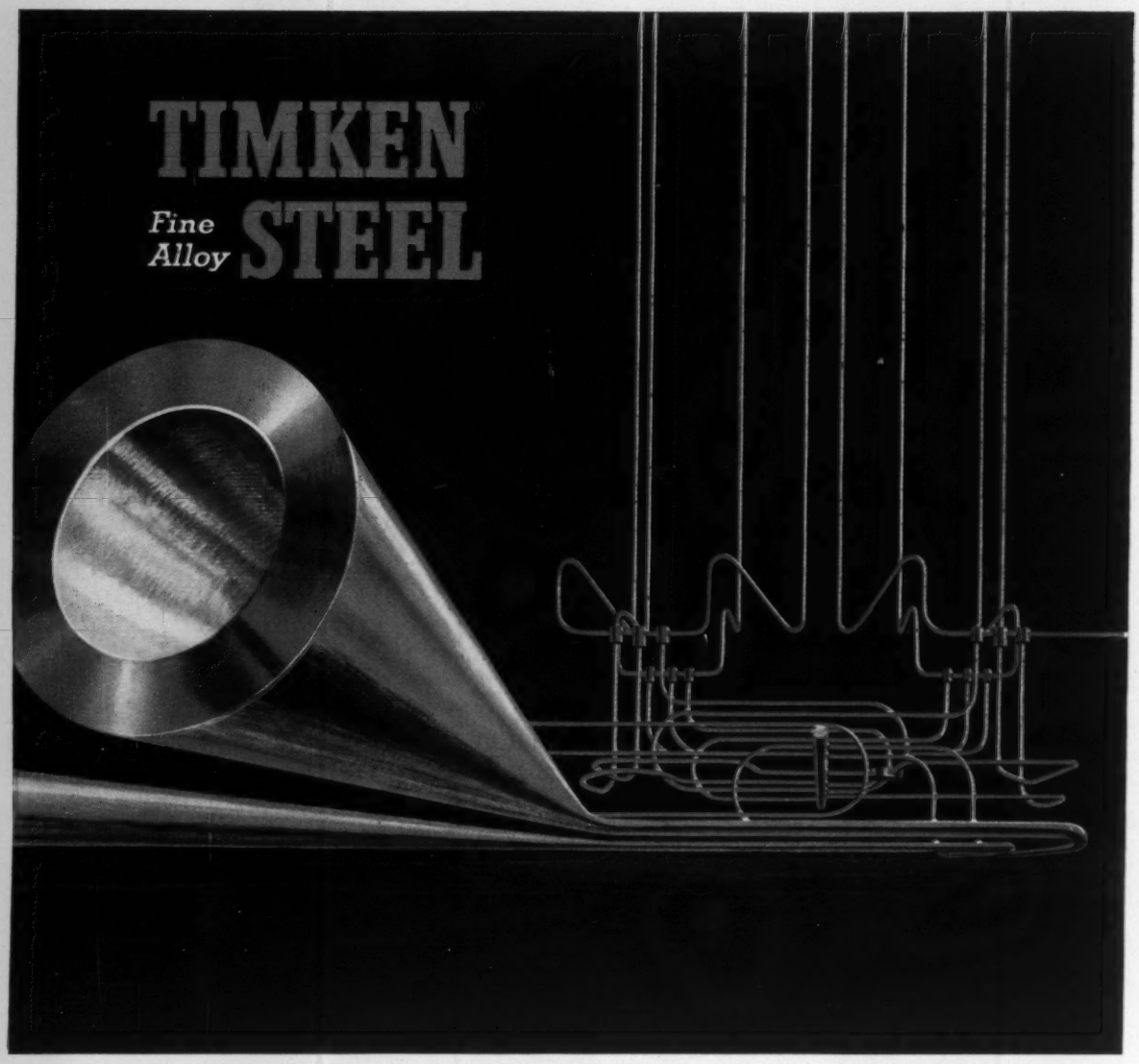
CONSTRUCTION CONTRACTS SHOW INCREASE IN APRIL over February and March on a seasonally adjusted basis, according to F. W. Dodge Corp. While April contracts of $3.36 billion were down 11 pct from April of last year, Dodge notes that April, 1959, contracts were the highest (adjusted) in history. One pickup in contracts over April 1959: Heavy engineering contracts, up 9 pct.

KEEP IN MIND THE PLUS FACTORS in planning your production and sales schedules in the months ahead. Two of these are: Spending for new plants and equipment, and consumer buying. Capital spending this year should increase 14 pct or more over last year, Commerce Dept. predicts. Sales to consumers, after a slow start, are now running ahead of expectations.

CONSUMER PURCHASES OF DURABLES ROSE in first quarter to $43.7 billion, an increase of 5.8 pct over same period sales in 1959. Automobiles and parts accounted for $18.2 billion, and household equipment for $18.7 billion of the total purchases.

EXPORT EXPANSION DRIVE GETS DOWN TO BUSINESS as Commerce Dept. announces formation of regional committees in 33 cities. The committees, some headed by metalworking industry executives, will soon be calling local meetings to discuss foreign trade opportunities and to exchange overseas selling experiences.

NET NEW ORDERS FOR MACHINE TOOLS showed mixed signs in April. Orders for cutting type tools slipped from $48.45 million in March to $36.75 million in April. Orders for metal forming types amounted to $14.9 million for the month, up from $13.5 million in March.



Watts cooking

Here's how they're cooking watts and keeping light bills down for customers of The Cleveland Electric Illuminating Company. In a new 250,000 Kw steam station at Avon Lake, Ohio, they put extreme pressures and temperatures to work to get more energy from each lump of coal. It's only the third power plant in the United States to crack the critical pressure barrier.

To transfer the red-hot 100 m.p.h. blast of steam from boiler to turbine with ordinary carbon steel would require piping of fantastic dimensions —with walls three feet thick—and from the top of the furnace down to the turbine it's a seven-story drop. The problem called for seamless tubing that was strong and tough—a super stainless steel.

The piping contractor for the new plant, The Pittsburgh Piping & Equipment Co. asked the Timken Company to produce AISI type 316 main steam piping for this extremely rugged high temperature, high pressure service.

Timken Company metallurgists specified a carefully balanced alloy content, made in the most modern electric melting furnaces. That's the key to producing pierceable super alloys. The result was stainless steel tubing with wall thickness light enough to permit a much lower cost. As for strength, the high alloy content of this steel should enable the tubing to carry red-hot steam 24 hours a day —for 40 years!

Whether your steel problem is size, weight, pressure, temperature, oxidation, or all of these things (as this problem was), call in Timken Company metallurgists! Their 40 years of experience in making fine alloy steel will give you a fast, low-cost solution. ***When you buy Timken steel you get . . .*** *1) Quality that's uniform from heat to heat, bar to bar, order to order; 2) Service from the experts in specialty steels; 3) Over 40 years experience in solving tough steel problems.* The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

What Industry Must Do to Make Foremen Real Managers

Today's foreman is often in a tough spot—undermined by management and mistrusted by the workers.

If industry really wants the foreman to manage, some current ideas must be scrapped.

■ The key man at the point where industry's work gets done is the foreman.

But today's foreman often sees himself in a management no man's land—undermined by superiors and mistrusted by subordinates. If management wants to make the foreman a real manager, some current ideas must be scrapped.

These are the conclusions of a new study conducted by the Opinion Research Corp., Princeton, N. J. Part of the ORC's Public Opinion Index for Industry, it's based on interviews with 188 plant managers and 160 industrial relations executives in many of the nation's largest companies.

Some Status, But—The survey shows:

Managers are convinced that foremen should be managers.

They give them the recognized symbols of management status (salaries rather than wages, pensions and other benefits, management time-off privileges).

Foremen get top responsibility in areas plant managers consider less important (housekeeping, safety instruction, and settling grievances).

But they are seldom given the authority they need to get the results expected.

Foremen have almost no influence in requesting time-study projects, starting cost-cutting action, hiring and firing workers, and preparing budgets and cost estimates. (See chart.)

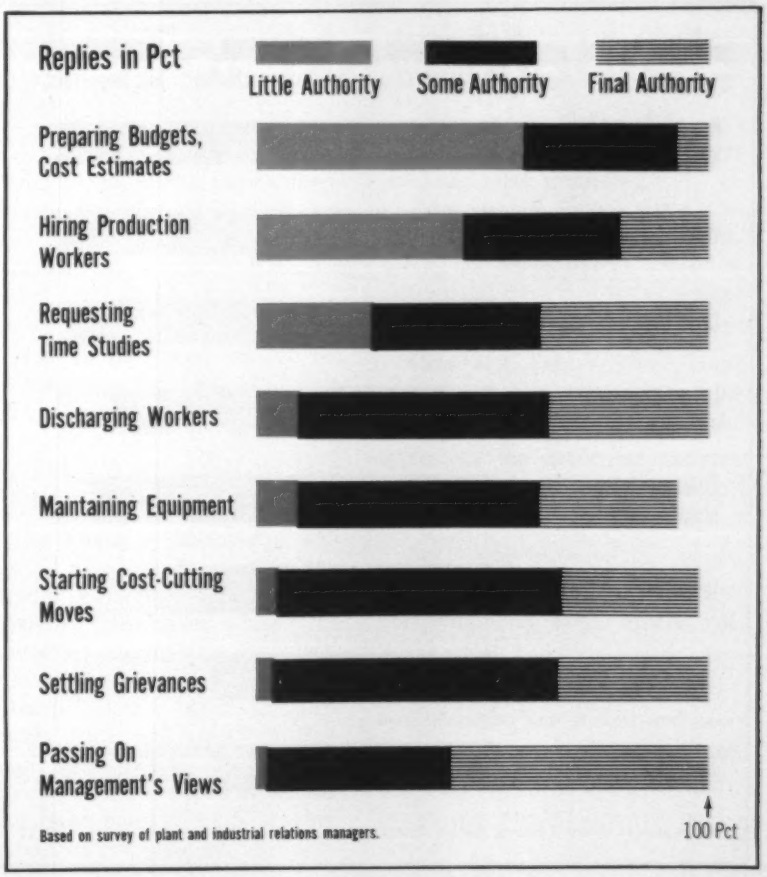
Anxious to Belong—In previous surveys, foremen said they want to belong to management. Only about one in ten had any active desire to join a foreman's union. Manufacturing foremen were asked, "Should foremen be part of management, or should they be more like workers?"

The answers: Almost 70 pct said part of management, 9 pct said more like workers, and 24 pct had no choice.

From this, it's clear about one-third of the foremen have doubts about serving on management's team. And it looks as though top management hasn't proved it wants foremen to manage.

A foreman in a steel company complained, "The foremen in this plant are pushed around by the union steward, by the men, and

Where Foremen Lack Command



Based on survey of plant and industrial relations managers.

then by management. It's a bad thing."

A paper company foreman said, "When it comes to authority, we just don't have any and that puts you in a box."

Management's Problem — The managers, however, often face many problems in making the foreman's job more attractive. Except in the largest operations, it's hard to fill new openings for foremen.

Some of the reasons: The job has little distinction. The best prospects don't want to give up union security and seniority. Production workers lack the management outlook. If the job is merely a training step for college recruits, the trainees find the work menial and promotion slow.

Growth Needed—The foreman's job isn't thought about in terms of management development by many managers. They point out that most foremen have already reached their "managerial ceiling."

But, if the foreman isn't included in management's development plans, it's not likely a new, better group of foremen will appear.

Right now, three managers in ten say they would have to go outside to fill any unexpected openings at higher levels.

And in the future more will be expected from foremen. (See chart.) Neither "up-from-the-ranks" nor temporary "college trainees" will meet these new demands, plant managers claim.

Says the plant manager of a metals company: "The big problem is finding people who are good candidates for the foreman job and who have promotable prospects above it. The present men won't do and we can't stand a bunch of trainees.

"We will need a complete reorganization of the line and staff when our new automation program comes in . . . (foremen) will get more responsibility and authority . . . the need will be for career men who know human relations, technical aspects, and are strong on budgets and costs."

More Authority—Another plant manager adds, "Our new concept is: Give the foreman a job and make him responsible for the manpower, processes, and costs. He makes all the decisions that have to be made in connection with the job. And he is measured accordingly. On this basis, the foreman's job for a small area will be the same as the superintendent's job has been for a larger area."

Plants who have the most experience with college-trained foremen, like the idea. But, unless the job is improved, the college-trained foreman may be just one more management problem.

Actually, many upper level managers of tomorrow will be men up from the foreman ranks. In-plant training and promotion from lower plant levels are still the best sources of management replacement.

What Can Be Done?—With all this in mind, what can be done to turn foremen into real managers?

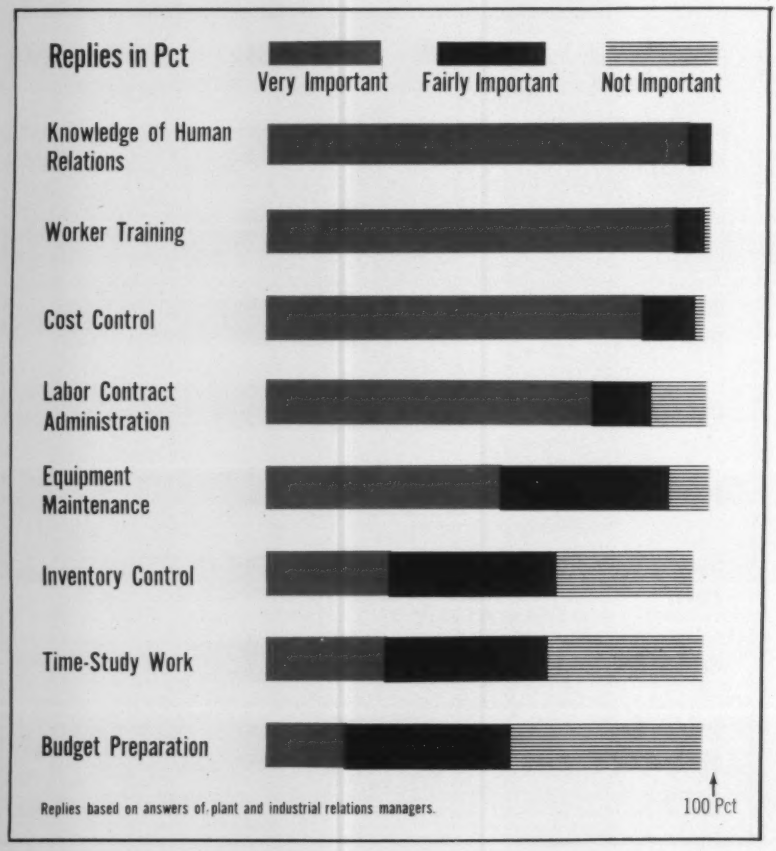
One reason why it's difficult to make foremen part of management is the catch-all nature of the job. The foreman is given varied duties that don't fit in well with the objectives of other managers.

If career foremen are wanted, the survey concludes, management must take some of these steps:

Redefine the Job: If the foreman is really a manager, his job must be planned to give him authority over all the duties he can handle. He should have a chance to share and develop the same management ideas as other managers.

Better Selection: Right now educational requirements in many companies are loose. Often companies use tests to help pick the best candidates. But these tests are less than satisfactory. The complaint: They

Skills Foremen Will Need



Replies based on answers of plant and industrial relations managers.

don't relate too well to the job's duties.

Upgrade Education: Few managers say every foreman should be a college graduate. Over a third say formal education isn't a requirement for foremen's jobs in their plants. Some standard level of educational progress must be set up.

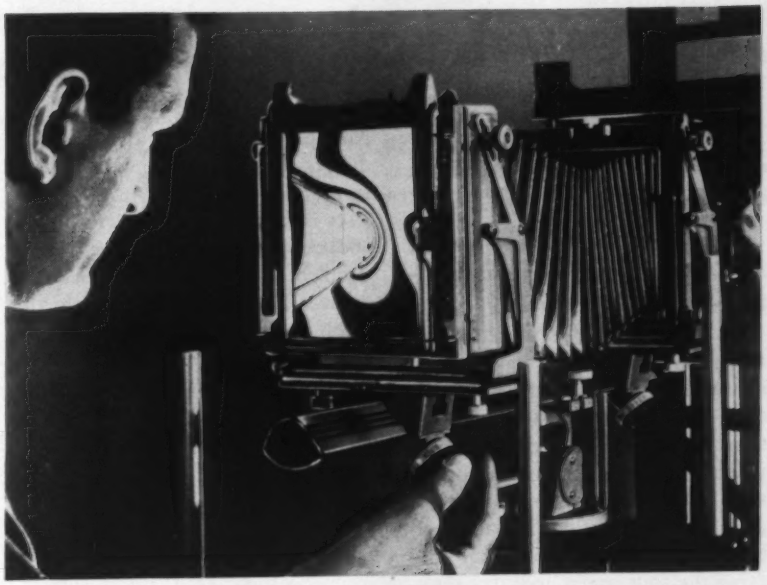
Re-examine In-Plant Training: Training must be more than just developing day-to-day job skills. It's aim must be bringing out the best in the trainees. The foreman's job should be the first step up the ladder—not the end of the line.

Clear Up Job Insecurity: The foreman is the only member of management who can be bumped down into the bargaining unit. As long as the threat of being bumped back to blue collar rank exists, it's hard for foremen to claim manager status. Plant managers admit foremen are subject to layoffs and downgrading more than other members of management.

Study Financial Incentives: Managers report the average pay of their first-line foremen and supervisors is around $7500 a year. Compared with a top rate of around $4 an hour for skilled union craftsmen, the rewards in being a foreman are low.

Allow Foremen to Supervise More People: If salaries are raised, however, the foreman's job must be enlarged. The clutter of side duties must give way so he can supervise more people. Right now, some companies have foremen supervise fewer, rather than more men.

Recognize Plant Managers Can't Work Miracles: Even when changes are needed, plant managers can't go out and order a group of perfect foremen. They have many foremen who can barely handle their present job. As the foremen's role changes, these men must be handled with fairness and tact. Some companies back up the less capable man with an assistant who can eventually replace him.



AT THE SHOW: Demonstration of a new socket screw thread by Standard Pressed Steel Co. is a typical display at Design Engineering Show.

Materials Battle For New Markets

■ At one end of the Union Carbide Corp. display at the Design Engineering Show at New York last week, company spokesmen were explaining to visitors, "Metals are better . . . Do more all the time . . . thanks to alloys."

And at the other end of the same booth, other spokesmen were telling visitors that plastics were about to recapture the market for television cabinets which had been lost to steel.

The Theme — This pretty well marked the theme for much of the show. It was a battle between materials for markets in industry. In most cases, metals were the target.

Borg-Warner Corp. introduced a line of plastics which it called "tough, hard, and rigid." Anchor Plastic Co. had line of plastic extrusions. And some plastics makers were more pointed. U. S. Rubber Co. said its new group of elastomers were "more rugged than manganese steel and other metals."

Pennsylvania Fluorocarbon Co. said its new line of exstruded plastic tubing and monofilament "can often replace the service of stainless steel at much lower cost."

Give and Take — These comments, to which metals men said they had the answers, are only typical of the battle for markets that is going on among materials makers.

But it was apparent that metals were ready and able to handle the competition. A large number of major steel and nonferrous producers and associations had impressive displays. New metals and new uses for older metals popped up in many of the displays of companies exhibiting fabricated products.

A New Look at Steel Problems

AISI meeting discloses a new approach to a new set of steel industry problems.

Four key problems: Labor, efficiency, competition and profits.—By Tom Campbell.

■ The man who came to dinner at the American Iron and Steel Institute meeting in 1936 would not have recognized the atmosphere last week. The same people, and others who came up from the ranks, were at this year's meeting. But the serious, expertly-planned meetings covering the four major industry problems—labor, efficiency, competition, and profits—were devoid of bombast, self-congratulatory kudos—and the dead past.

The industrial humility present at New York's Waldorf Astoria was significant. But more to the point was the old steelmaster who charted the problems ahead for the industry.

Fairless Speaks — Ben Fairless, AISI president, and a man who has been through every phase of the industry's growth, laid it on the line. Not that he talked of the past. He didn't. His pitch dealt with the future and its "or else."

It is significant that Mr. Fairless spotted labor peace as the No. 1 problem in the industry. He scuttled forever any talk that anyone in the steel crowd could turn back the clock. But in hammering that home, Mr. Fairless left no doubt to anyone in the packed hall that the responsibility is two-fold — the industry's and the union's.

Tell the Story—Without taking any "whodunit" stance on the late and costly steel strike, Mr. Fairless—who should and does know—labeled it senseless extravagance.

One thing was clear right at the start—and later underlined by chief steel negotiator Conrad Cooper: The employees are going to get the facts, the reasons for actions, and the real story of what the steel industry is trying to do.

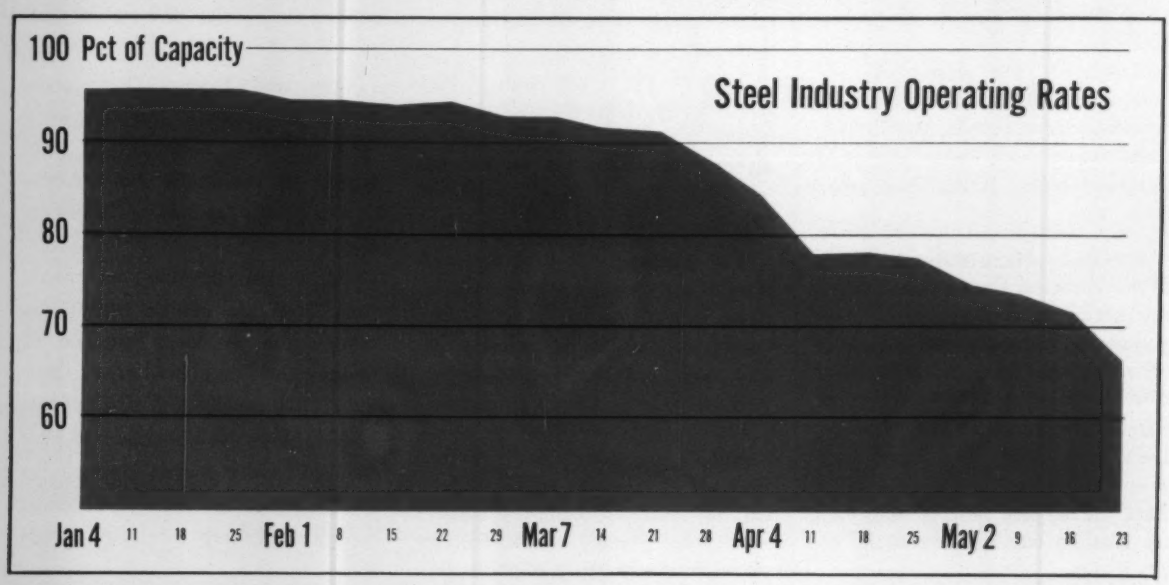
Employee Is Key—From all the talks—including those at a jam session of public relations and industrial relations people—this is clear: The employee is king-pin in the steel industry today—and for quite some time to come.

The steelworker is the key to better communications, to better competition at home and abroad, to better working conditions, to proper profits, and, most of all, to new growth in steel. The last point is needed if the other points are to be met.

At no point, and in no talk, was there any sabre rattling, any "I told you so's," or any sense of having been a whipping boy. That is why a man from 1936 or from 1929, returning to an Institute meeting, would have been completely flabbergasted, as were many of the diehards in the audience.

On Depreciation — Even when Joel Hunter, Crucible Steel head, drew the picture of a better deal in depreciation, it was a hard hitting, unemotional work piece. Here is his warning: "These two factors . . . jeopardize the value of plant investment: The decline in the value of the dollar, and technological obsolescence of both plants and processes. They directly affect our plant

When Will Steelmaking Operations Rebound?



Toward Better Communication

One of the failures of the last steel labor negotiation was inability of the steel companies to get through to the workers with letters and pamphlets. And no wonder!

Here is a list of some of the expressions men did not understand or, that, when they did understand them, discouraged them from reading further. Alternate expressions are suggested. (Prepared by Group Attitudes Corp.)

Expression	Translation
"Avoid further inflationary pressures"	**Avoid the things that make prices go up.**
"Changes would be sanctioned only if . . ."	**No changes would be allowed unless . . .**
"Ultimate solution"	**The final answer**
"Endeavored to interest union leaders affirmatively"	**Tried to get Union leaders to agree.**
"In all sincerity and complete conviction as to the merit in the public interest"	**Because we sincerely believe it is best for everyone.**
"Modify the discipline"	**Lighten the penalty.**
"Not justified on any basis of equity"	**All give and no take; not a fair deal.**
"Reject summarily"	**Turn down flat.**

values, and the annual recognition of depreciation should take both into account."

Advice from Worthington — Les Worthington, the new president of U. S. Steel, said it best when he made the crack that his was the first sales pitch presentation at an AISI meeting he recalled.

Mr. Worthington pulled the cork out when he said committees which have worked hard to put steel forward could be sterilized if action was not taken by individual firms after they got the ammunition.

About foreign competition: Mr. Worthington said it is here to stay. But no one at any time even whispered the need for high tariffs. The answer was all contained in better labor relations, better equipment, a better break on write-offs, and selling like the industry has never sold before.

Better Communications — Never again will the steel industry "spot" communicate with employees only at negotiating time. The die is cast. It will be a continuing job from here on.

The jam session on communications will probably mark the beginning-of-the-end of harsh, bitter, misunderstood company - employee relations. Going direct to the worker instead of through the union, the steel companies hope to get their points across. After careful and continuous communications, they hope the worker will see just where he fits in the long-term picture of a healthy steel industry.

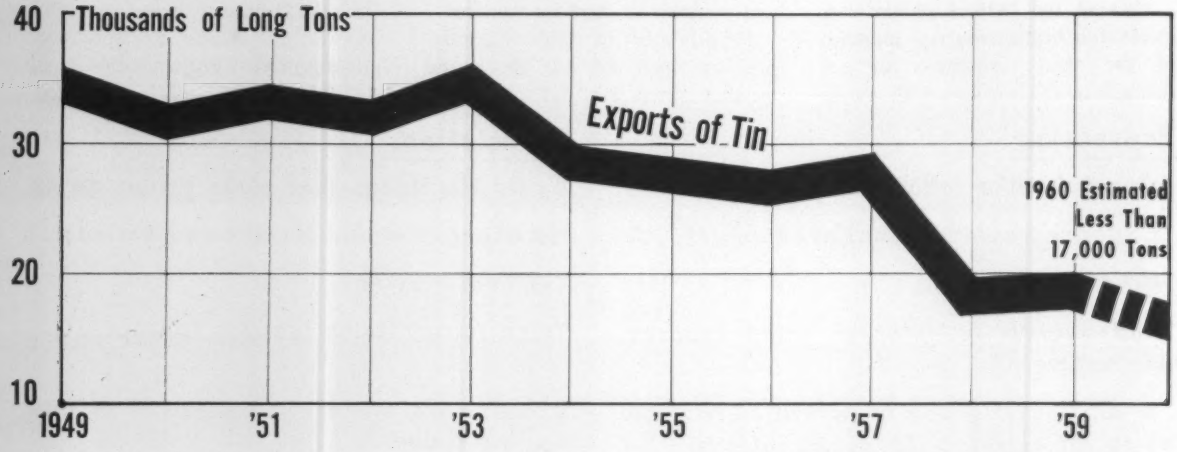
What Surveys Showed—To help along the new phase of the program Miss Jane Stewart, vice president, Group Attitudes Corp., a Hill and Knowlton subsidiary, gave a rundown on her surveys and analyses during the strike. It was clear that words mean one thing to the companies and quite another to the workers. (See box.)

One thing is clear: The public and industrial relations people reacted and changed course because of the surveys. It is clear now that things will be quite different in the future. And surveys will be one of the main tools.

Emotional Gap—Conrad Cooper, chief negotiator in the past strike, said the emotional gap in communications can be bridged if well-informed foremen are given the training, the go-ahead and the support. But attitudes and ideas must be negotiated 365 days a year. One small item mentioned by Mr. Cooper indicates that the companies would no longer make commitments to hold their announcements until a stipulated time, such as after the wage-policy meetings. Leaks by the union side, he implied, made it hard or impossible to get across the company side of the story.

The quote of the week came from Tom Patton, Republic Steel president and onetime steel negotiator. Tom, an old hand at the tough and sensitive business of dealing with the union people, said, "We have used our communications primarily to put out fires rather than prevent them. This has been particularly true in the field of labor relations, but it applies to public relations as well." To which a few disguised voices among the company people in the back said, "Amen."

Why Bolivian Tin Is in Trouble



Tin Crisis Shakes Bolivia

The big problem lies in Bolivia's unmanageable labor force with steep worker benefits.

Industrial diversification and belt-tightening by government and labor is only hope for economy.—By R. W. Crosby.

■ The long-suffering Bolivian tin industry faces perhaps its greatest crisis since 1952 when 70 pct of the industry was nationalized.

And as the Bolivian tin industry goes, so goes Bolivia. Tin is 80 pct of the country's balance of payment.

Tin production in Bolivia is at its lowest ebb. Bolivia is exporting half as much tin ore as it did 10 years ago.

Excessive Costs — Even more critical, if true, is word from government sources that Bolivia's cost of producing tin is exceeding the selling price. It is said the production of a pound of tin costs Bolivia around $1.40. The same pound is bringing less than a dollar on the market.

The U. S. is keeping Bolivia's head above water. Uncle Sam pays 30 pct of the Bolivian government budget besides helping with special grants and technical cooperation. This amounts to about $16 million a year.

Labor Tough — Bolivia's main problem is its unmanageable labor force and outlandish worker benefits dating back to the 1952 revolution. There are thousands of workers in the tin mines who are not needed. But when the government tries to cut costs the workers explode.

A three-week strike in the mines has just ended, but it is an uneasy settlement. Diplomatic sources say it only puts things at a standstill until next month's national elections.

It is a foregone conclusion that the elections will put the present government party back into power.

One Effort—A group of government tin officials are meeting now with the mine workers to discuss dismissal of several thousand workers, cutting down losses in the workers' food subsidy program, and shutting down some of the mines.

The government also is trying to diversify the national economy, building up its oil industry and agriculture. Whether the government will succeed or not is anybody's guess.

U. S. Concern—The U. S. government expresses "grave concern" over the problem. Not only is Bolivia tin in jeopardy, but the mine problem could lead to social and political unheaval.

It is rumored that Bolivia is seeking additional funds from the U. S. That's possible but wouldn't do any good. U. S. aid to Bolivia is set to go down, not up.

For the world market the outlook is for less and poorer quality Bolivian tin.

There is no easy out for Bolivia. Its only hope—for the salvation of its tin industry and, therefore, its economy—is a long term stabilization plan based on a tightening of belts by government and labor.

IBM Automates Management

System Handles Six Major Manufacturing Functions

Management Operating System can schedule production, regulate inventory, forecast sales, and initiate purchase orders.

It can even evaluate the success of the entire operation. —By K. W. Bennett.

■ The long-heralded push-button factory may be run by a push-button management.

International Business Machines unveiled its 60-day-old Management Operating System last week. Built around a Ramac 305 computer, it is a nest of four machines. The system will schedule production, regulate inventory levels, apply and constantly correct the sales forecast, initiate purchase orders. Finally, it will evaluate the success of the entire operation.

User's Experience — IBM indicates the new unit will rent at $4,000 per month. The company is going after firms as small as 300 employees for its market. For bigger companies, bigger versions of the same unit are offered at up to $80,000 per month.

American Bosch Arma Corp. installed most, but not all, of a Management Operating System (MOS). And it reports savings of $120,000 annually in production costs. The installation covers only inventory management and materials planning. Savings are expected to triple when the system is complete.

Other users of partial systems; Bell & Howell, Sciaky Brothers, Sharon Steel. One has already called for the complete system, believes it can double output.

Aim at Industry—IBM believes that 45 to 55 pct of its computer output is already going into manufacturing operations. Competitors Remington-Rand Univac, and General Electric are eyeing the same market target. All are pushing for more computers in smaller plants, but aren't missing the already eager market among larger firms.

As IBM announced MOS, Remington-Rand Univac announced Univac III, fastest big machine it's built to date. This is aimed at big industry, and will rent from $17,500 to $30,000 per month.

Major Functions—IBM sees in MOS one of its strongest computer applications to date. It covers in detail the six major functions of any manufacturing plant. These include sales forecasting, materials planning, inventory management, plant scheduling, work dispatching, and operations evaluation.

Comments one IBM official, "We have over 2000 potential customers in the general Chicago area, alone."

Fast Work—MOS uses conventional computer hardware, IBM points out. The company merely combined this hardware into one unit that will perform functions computers have been doing piecemeal fashion in the past.

It prints purchase orders, employee efficiency reports, shop orders, and other orders necessary to running a plant, at 84 lines per min. This can be speeded to 1000 lines per minute if necessary.

It will analyze punch cards at 200 cards per min. The magnetic memory will store 10 million letters or numbers. This can be increased.

INVENTORY CONTROL: S. E. Miller, vice president and general manager of American Bosch Arma Corp., stands in front of Ramac 305 computer that keeps track of 15,000 parts used for the company's products.

Castings Take on New Luster

High-Purity Aluminum Produces Bright Finishes

Until now, it hasn't been possible to get a brilliant anodized finish on aluminum castings.

But one company is doing it by casting high-purity aluminum. —By F. J. Starin.

■ An extra-bright finish on aluminum castings could be opening a whole new market for high-purity aluminum. And the best market potential seems to be in areas where color is wanted, according to Howard Fromson, president of Fromson Orban Co., New York.

For several years Fromson Orban has been selling a line of high-purity aluminum sheet and strip. The material costs about twice as much as commercially pure aluminum. But customers willingly pay the cost penalty because of the brilliant anodized finish that can be obtained.

Mirror, Mirror . . .—Just how brilliant is the anodized finish? Mr. Fromson uses a silvered mirror as the base for comparing reflectivity. In this case, he says, anodized high-purity aluminum rates 84.1 pct. This compares with 59.5 pct for stainless steel, 63 pct for chrome-plated steel, and 69 pct for rhodium-plated nickel, he claims.

For some time, users have been interested in the possibility of die-casting Lurium, the company's name for its high-purity aluminum. The reason: There's less scrap than with stamping for example.

Joint Project—Unfortunately, Mr. Fromson points out, no aluminum castings would give the same brilliant finish available from high purity aluminum sheet and strip.

Then Mr. Fromson, who holds over 70 patents in the metalworking field, began working with David Morgenstern, president of Nelmor Mfg. Corp., Euclid, O., to lick the problem.

In less than eight months they had solved the problem. Mr. Morgenstern is the inventor of the vacuum casting technique that is the key to diecasting high-purity aluminum.

Bright and Colorful—And Fromson Orban is now offering Lurium discastings, anodized clear or with the same range of colors as on wrought aluminum.

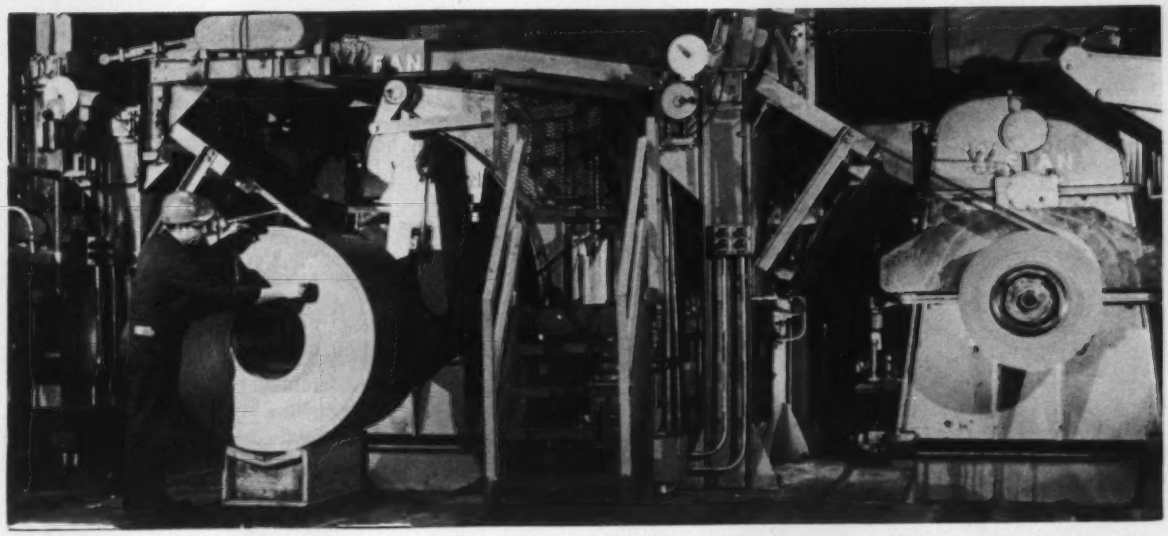
Cost Considerations—Mr. Fromson believes that the much higher cost of the material compared with commercial aluminum is not a major marketing problem. "No one is going to buy anodized high-purity aluminum die-castings unless he wants the added appearance, he explains. But long runs will help close the cost gap."

One example: Fromson Orban was able to deliver a three-piece set of parts for only 2¢ per set more than it would have cost with commercial grades of aluminum. But the fabricator sold the finished item for $25, so the cost factor was negligible.

Where Are Markets—How much of a market does Mr. Fromson see for diecast high-purity aluminum? Plans call for about 100,000 lb of castings per month. But Mr. Fromson expects to be straining the company's capacity shortly.

"We'll have no trouble finding prospects," notes Mr. Fromson. "All we have to do is dig out our file of people who asked about casting when we were trying to sell them sheet or strip."

BRIGHT FUTURE: Howard Fromson predicts growing market for castings made of high-purity aluminum because of brilliant finish that can be obtained with either a clear or color anodizing.



READY FOR MARKET: New continuous annealing line at Jones & Laughlin points out steel industry's efforts to improve tinplate quality and, in that way, improve its market for metal cans.

Soft Drinks Lead to New Markets

Tinplate makers are anxious to get a share of the soft drink container market.

Last year 50,000 tons of tinplate were used. But even more is expected to be used in 1960.

■ Over the past six weeks, the biggest suppliers of soft drinks have moved decisively toward the use of cans for retail sales.

Pepsi-Cola Co. has begun regular distribution of canned drinks. Pepsi cans are being filled by five contract canners and four franchise bottlers. And the company has its own canning line due for completion at Long Island City, N. Y., this month.

Can of "Coke"—Coca-Cola is also offering cans for retail use. It has its own can filling lines in California and Massachusetts, plus arrangements with independent and franchise canners. Designs of three leading canmakers have been approved for use by Coca-Cola.

However, both Pepsi and Coca-Cola appear to have reservations about the can program. Pepsi leaves the decision up to the individual bottler. Coca-Cola takes a similar position.

"We're not taking any aggressive action," says C. W. Hodgson, Coca-Cola vice president.

The Green Light—Nevertheless, 70 bottlers in the Coca-Cola system now have cans. Many of these are specialized applications, but all bottlers are offered the option of using cans for general retail outlets.

Canada Dry and other brands have been using cans for some time. And, prior to the current surge, use of cans has been growing at a respectable rate. Over 500 million cans were sold in 1959 when the industry consumed 50,000 tons of tinplate.

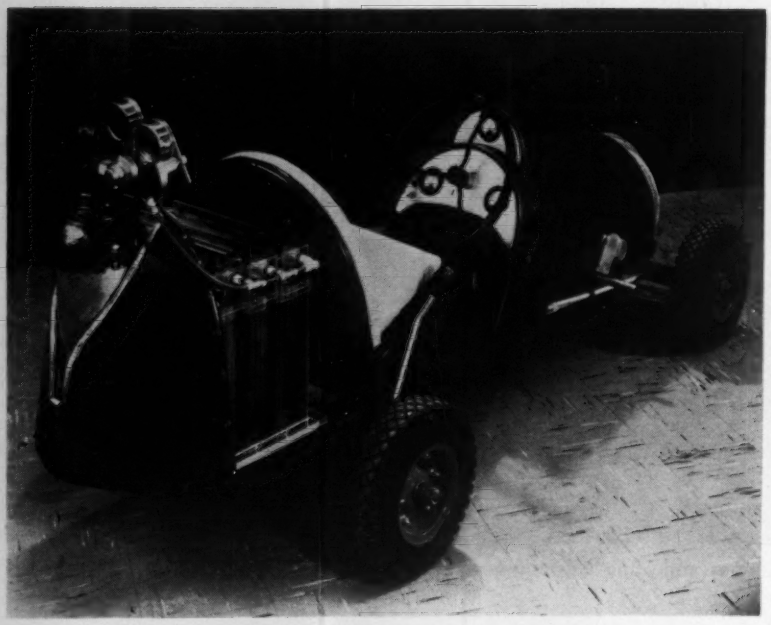
High Jump—These figures reflect a 70 pct jump over 1956 levels. However, the 1959 total is still relatively minor when compared to the market potential. Of the 32 million soft drink containers used last year, only 2 pct were cans.

Prime backers of the soft drink can are scaling their efforts to much bigger things. With a 10 to 15 pct slice of the market seen for tinplate, United States Steel Corp. is spending $1 million this year to sell consumers on soft drinks in cans. And can manufacturers have been making a strong pitch to beverage suppliers.

The Big Two — After holding back from general distribution of canned drinks to retail outlets, both Pepsi-Cola and Coca-Cola (who are said to control 42 pct of the soft drink market) appear to be ready to give the cans a full-scale trial. Royal Crown Cola Co. has been canning soft drinks for over five years and reports the trend is growing. Over 40 companies are now using cans.

According to a tinplate man, soft drink cans will have to fight a price bulge of one to one and a half cents per unit.

Tinplate men say they are not out to replace the bottle. They only want a modest share of the market.



PROTOTYPE POWER PACKAGE: This "racing car" didn't run in the Indianapolis 500, but it runs. New fuel cell powers the vehicle.

Zinc Powder Fuels New Power Cell

▪ The goal of converting fuel directly into commercial electric energy moved a step nearer reality this week as another big company entered the fuel-cell sweepstakes. Fuel cells can be at least 80 pct efficient —which is about double today's conventional engines and generators.

This week Exide Industrial Div., Electric Storage Battery Co., Philadelphia, announced that it had signed with a dozen builders of material handling equipment in a program to develop a fuel cell for industrial trucks.

Zinc-Oxygen Unit — A commercial cell is some years away, Exide says. But it has moved from research to development of a zinc-oxygen unit. Other types are being studied.

Its engineers predict that such a cell will run a heavy duty lift truck for 16 to 24 hr without recharging. Eventual use in autos and trucks is also seen.

Runs "Racing Car"—In the zinc-oxygen cell, powdered zinc in plastic tubes surrounds a positive bar in a potassium hydroxide electrolyte. (The catalyst in the electrolyte and the positive electrode material are secret.) Oxygen under 10 psi pressure oxidizes the zinc to create current.

The prototype fuel-cell is a 200 amp-hr unit that runs a small "racing" car. It contains 18 cells, each rated at 1.5 v. This is smaller and lighter than a conventional storage battery of equal power.

And while weight saving is useless in most industrial trucks, these features will count in other uses. In either case, efficiency is higher—and that is the goal.

Armor Awards

The Army has awarded contracts totaling about $60 million to Chrysler Corp. for the production of 720 M60 tanks. At the same time, a contract totaling $20 million for building 212 of the Army's new M88 tank recovery vehicles was awarded to Bowen - McLaughlin-York, Inc.

The M60 will be assembled at the Detroit Arsenal, Centerline, Mich. The recovery vehicles will be assembled at the Bowen - McLaughlin-York, York, Pa., plant.

Raytheon Corp. received three letter contracts from the Army for work on the Hawk missile system.

Work includes ground equipment, field maintenance equipment, components, factory test equipment, megnetron test equipment.

Hearings Reopened

Hearings to determine prevailing minimum wage rates for the fabricated structural steel industry will be reopened June 14 in Washington.

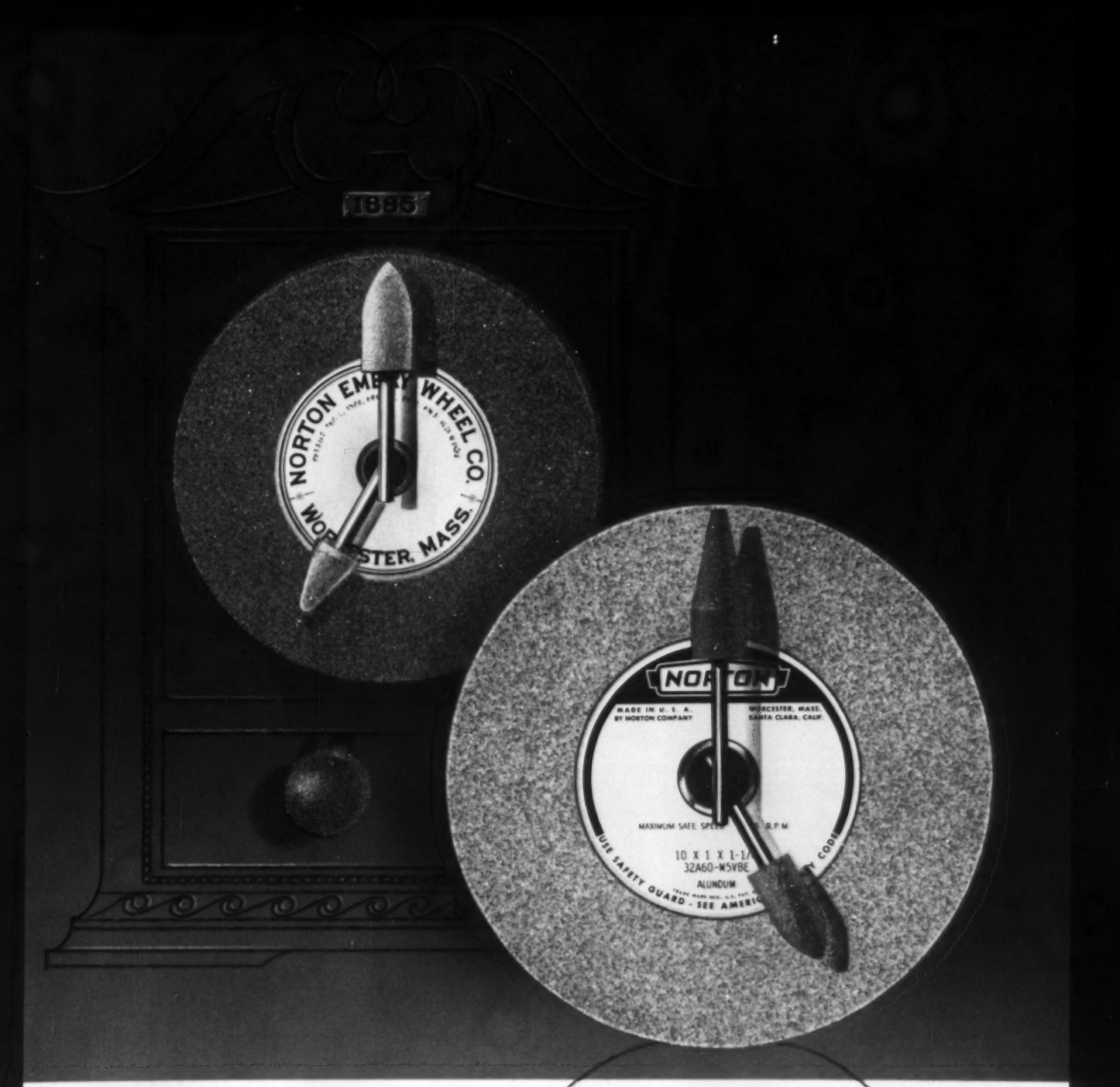
The reopened hearing will be limited to evidence on: Whether the determination should be for one or more localities. Whether separate determinations should be made for galvanized and non - galvanized products. And what are the minimum wages which prevail for each product and locality for which determinations should be made.

A Business Cost

Fees paid to employment agencies will continue to be tax deductible.

Internal Revenue Service, in a reversal of a recent ruling, now says a 40-year policy of permitting such fees to be deducted from taxes will not be changed. A month ago, IRS had announced that it would in the future not consider these fees as business costs.

The earlier ruling was withdrawn, tax officials say, because it would be easier from an "administrative standpoint" to continue permitting deductions.

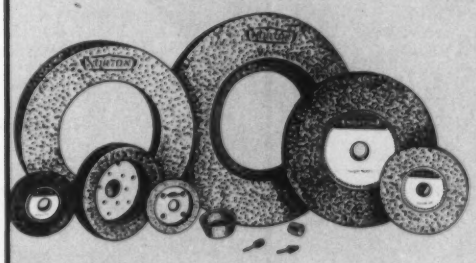


75 years... a lifetime of progress

The Norton story begins in the dim past, farther back than 1885. But it was in that year that a group of forward looking industrialists founded the Norton Emery Wheel Company in Worcester, Massachusetts.

Today, Norton Company looks forward with equal confidence to its continued growth under sound financing, progressive management and with loyal employees. And it looks back with pride upon 75 years of steady progress in developing and applying the world's largest line of abrasives to meet the needs of industry.

It's your Norton Man's
75th ANNIVERSARY, *too*



To say that "it's your Norton Man's 75th Anniversary, too," has nothing to do with his age. But it has a good deal to do with his qualifications as your production consultant. For the experience of Norton Company — since its founding in 1885 — is, in a very real sense, his own personal background.

For example, your Norton Man's thorough training at the Worcester Plant is based on the Company's 75 years of developing the world's largest line of abrasive products — including the widest range of grinding wheels, from mammoth pulpstones to miniature mounted wheels; discs and segments; abrasives for polishing, lapping, tumbling and pressure blasting.

Typical Norton Advancements

Norton was first to introduce all three bond types of diamond wheels, and now uses man-made as well as mined diamonds to meet today's broader needs . . . introduced NORBIDE® boron carbide, next to diamonds the hardest material ever made by man for commercial use . . . and the latest Norton advancement is the opening of another new five-acre plant, built for the sole purpose of using new, modern methods to manufacture resinoid bonded wheels, favorites among foundries and other users. Besides developing these and many other types of abrasive products, Norton has constantly improved grinding techniques throughout industry.

Your Norton Man's Heritage is this wealth of technical know-how gained by Norton in 75 years, backed by his own practical training and field experience. As your Abrasive Engineer, this combined background qualifies him to give you expert advice on the selection and use of grinding wheels. He'll supervise test runs of wheels in your plant and will give you every aid in bringing the lowest cost-per-piece to your production economy.

Nation-Wide Deliveries and Service

In the United States, Norton manufactures in Worcester, Mass., and Santa Clara, Cal. and maintains immense factory stocks plus warehouse stocks in five conveniently located cities. Norton distributors in 283 cities keep their stocks fully adequate to the needs of their areas. For prompt deliveries, helpful service, and contact with your Norton Man, call your Norton distributor.

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*Warehouse Facilities and Stocks at this location

BEHR-MANNING CO., Troy, N.Y. is a Division of Norton Company

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

4-60

Dr. Leslie Gulton

He Built a Fast Growing Firm

In the past 10 years Dr. Gulton has changed his firm from one with relatively small sales into one doing $15 million annually.

The basis for the success, he says, is top quality research.

■ In the past 10 years Dr. Leslie Gulton has built Gulton Industries, Metuchen, N. J., from a company doing $50,000 sales annually to one now doing $15 million.

How? By a system Dr. Gulton calls "mental cross pollination."

Gulton Industries makes a wide variety of products—ranging from a rechargeable flashlight with nickel-cadmium battery, to ultrasonic cleaning and welding equipment. Most are industrial products. And almost all are in a field where even some of the basic principles weren't even discovered as recently as five or 10 years ago.

Research Is Key — A business such as this depends on research. Dr. Gulton refines his research as much as possible.

The most complete, and therefore the best, research program must be on an international scale, he says.

Dr. Gulton hires the best graduates of American universities that he can. But also, once or twice a year the Gultons, (Dr. Edith Gulton is a noted organic chemist) travel to Europe, where both were born.

Return Trip — Almost invariably the Gultons return with one or more of the following:

Licenses to make and sell European developments on the U. S. market. (The company's only consumer product, the rechargeable flashlight, was developed in France. With a Gulton design aimed specifically at the U. S. consumer, it is turning a handsome profit).

DR. L. GULTON: He looks for the perfect research combination.

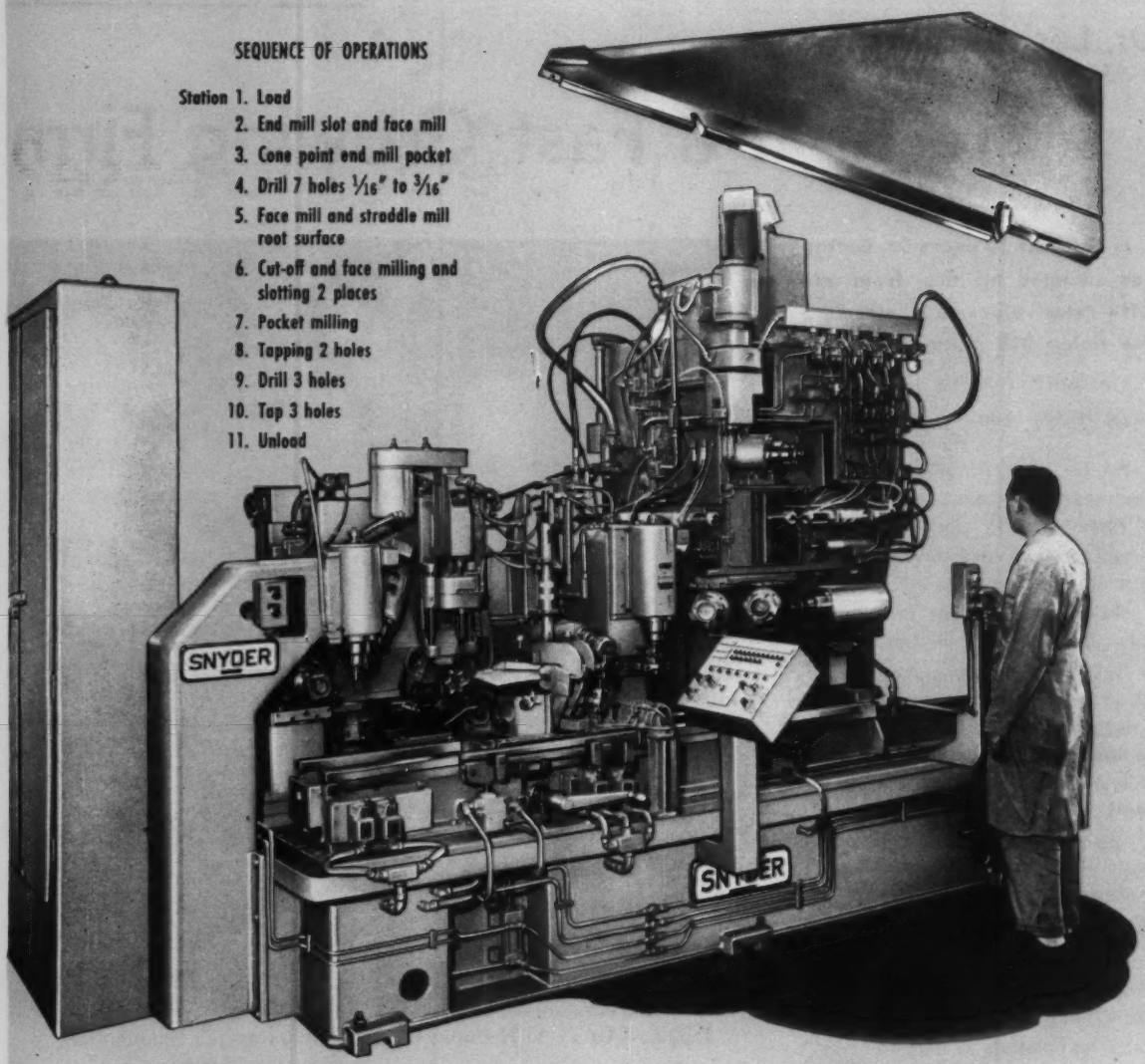
They almost always carry back notebooks full of the latest discoveries and developments in the laboratories of Europe.

Dr. Gulton notes that with all Europe has to offer, this material is not always easily available. As busy as his U. S. business success has made him, Dr. Gulton says he will not delegate these European "fishing" trips unless he can find someone whose contacts are as good as his own.

Top Combination—Occasionally the Gultons return with a promising young European scientist. This marks the trip as a great success.

Says. Dr. Gulton, "We like to put the European scientist and the American engineer side-by-side in the laboratory. The American starts with a piece of 'hardware' and figures ingenious ways to improve it. The European wants to find out what makes it tick. The proper combination of the two is hard to beat."

Wrong View—Of course, sometimes there are problems setting up the "mental cross pollination." For example, on a recent trip Dr. Gulton considered hiring one of the assistants of a French scientist doing outstanding work in ultrasonics. But all of the young men he talked to showed marked sympathy toward Communism, something Dr. Gulton has no desire of importing.


SEQUENCE OF OPERATIONS
Station 1. Load
2. End mill slot and face mill
3. Cone point end mill pocket
4. Drill 7 holes 1/16" to 3/16"
5. Face mill and straddle mill root surface
6. Cut-off and face milling and slotting 2 places
7. Pocket milling
8. Tapping 2 holes
9. Drill 3 holes
10. Tap 3 holes
11. Unload
SNYDER
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COMPLEX MISSILE WING GETS 24 PRECISION OPERATIONS IN SPECIAL SNYDER PROGRAMMING TOOL

at Martin Company's Baltimore Division

Production rate, tolerances and part configuration dictated the fundamental design concept of this exceptionally compact tool which has 11 stations and performs 24 operations.

The cycle can be automatic, semi-automatic or manual. Controls for multiple cycle operations are provided by utilizing basic circuits triggered by a programming control device.

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How Much Will Credit Increase?

Borrowing by consumers, industry and the government was an important factor in setting a new output rate.

More increases are predicted for the 1960's especially in consumer and mortgage debt.

▪ How well your sales go depends, to a large extent, on how much credit is available.

How much is bought by consumers, other companies, and the Government is decided, partly, by how much can be financed. Debt expansion last year had an important part in pushing the gross national product to its first quarter 1960 annual rate of $500 billion.

Records in 1959 — Public and private debt increased by a record $66.5 billion in 1959, Commerce Dept. figures show. All major users of funds borrowed substantially.

Borrowing for mortgage and consumer credit totaled over $70 billion, for an $18 billion increase in this area. Other types of individual debt were up more than $6 billion.

Corporations went into the money market for about half of the capital funds they needed. The other half came from depreciation allowances and earnings. Federal borrowing last year was on about the same scale as in 1958, despite larger tax collections.

Things to Come—But what about the future? How much borrowing will be needed in the 1960's? Economists took a look at the coming credit pattern during the recent annual meeting of the National Industrial Conference Board. Here are some of the predictions:

Three factors will lead to greater consumer credit, according to J. Andrew Painter, vice president, the First National City Bank of New York. These are: Population increases, economic growth, and changing money habits. He forecast more use of revolving credit. And he saw an increase in consumer credit from $52 billion in 1959 to a possible $100 billion by 1970.

Mortgage Outlook — Discussing the mortgage market, Prof. Ernest M. Fisher, of Columbia University's Graduate School of Business, noted that since World War II "federal agencies have taken part in nearly half the mortgage transactions."

For the future, he predicted: Increased participation by the government in the mortgage market. Greater effectiveness of government policies on the terms of mortgage credit.

Leon Kendall, economist for the U. S. Savings and Loan League, pointed out residential mortgage debt doubled between 1953 and 1960, rising to a total of $145 billion. By 1970, Americans will owe over $300 billion on home mortgages, he forecast, almost twice the 1960 amount.

Keep Plus Factors in Mind

▪ Keep in mind these two strong plus-factors in estimating your production and sales for the months ahead:

New plant and equipment. Total spending is shaping up at a hefty 14 pct above 1959.

Consumer buying. Retail sales, after a slow start, are running ahead of expectations. Outlook is for a strong second half.

Added together, these two elements will go far toward offsetting the reduced rate of steel production. Government economists now say they expect no meaningful pick-up in steel output until well into the second half.

More Capital Spending—The 14 pct increase in capital spending this year is a minimum figure, as Commerce Secretary Frederick H. Mueller, sees it. He anticipates total 1960 expenditures may be comfortably ahead of the officially-forecast rise.

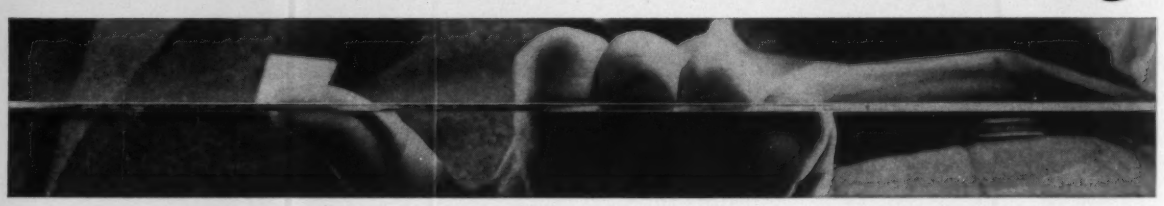
Some constructors heartily endorse the Mueller prediction, but others cautiously put the rise at 14 pct or a bit less. Either way, however, capital expenditures this year are running well ahead of last year's totals and are clearly going to stay ahead.

Consumer confidence is strong, and likely to stay strong. The rise in retail sales that started in late March and continued through April shows that consumers are not worried over a recession.

Personal income and buying improved in April, Commerce reports. Income on a seasonally adjusted annual rate was $397.5 billion, up $3.5 billion from March.

During the month department store and auto sales picked up. Department store sales were running 5 pct above a year ago through the first four months. Auto buying through April was at a seasonally-adjusted, annual rate of close to 6.5 million units.

Sees $4500 annual screw saving



RB&W fastener survey uncovers use of special item which is replaceable by standard hex screw at much less cost

Of course you pay more for a "special" than a "standard" item—and that includes fasteners. So, when surveying a company's usage of fasteners, the RB&W Man looks sharply for the "specials"—and a valid reason for their use.

He could find no good purpose for the extensive use of screws with heavy head and milled body in one particular product. There was neither a specification requiring close fit in very close tolerance holes . . . nor were there exceptionally "sloppy" holes that called for an oversize head to span.

He therefore recommended assembly with standard RB&W High Strength Hex Screws. They would meet any physical requirement for the "special" being used... *but cost 30¢ less per unit.* Yearly total: $4500 more for *profits* instead of *costs.*

Are you *sure* you're not needlessly wasting dollars on fastener specifications? Let the RB&W fastener expert survey them. He's made proper fastener usage a science, is ready to cooperate with your engineers. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.

How Mercury Launched a Comet

Others Will Soon Face Many of the Same Problems

Getting a new car off the ground, and doing it right, isn't easy. But Mercury did it.

At least four other automakers must solve many of the same problems by fall. — By A. E. Fleming.

■ The Buick Special, Oldsmobile F-85, Pontiac Tempest and Dodge Lancer are out of the hands of the designers. Tryouts of the tools and dies that will produce the stampings and parts for these 1961 model compacts have been going on for some weeks with success. Now it's time for the strategists—the market researchers—to prove their value.

They are going to have to sell American car buyers the idea that they want and need more compacts. The job may be tricky. The cars will enter the market several years behind Rambler and Lark, a year behind Corvair, Falcon and Valiant and six months behind Comet, their chief rival.

It may be an even rougher job in view of the fact that—like the Comet—Buick, Oldsmobile, Pontiac and Dodge have the historical stamping of "medium-price make" to contend with.

Compact Impact—Will an economy car in their showrooms lessen the effect of their regular models? The question is partly answered by the fact that at least two of the four manufacturers are expected to shelve some of their regular series next fall. Dodge for one. And perhaps Pontiac.

The people who planned the Comet, the compact marketed by Mercury, faced some of these same problems a short time ago. The car was publicly introduced in March. Today the car can't be turned out fast enough to keep up with demand. Most dealers have about one week's supply on hand.

Fill a Need—What were the steps that led to the Comet's successful launching? Why did the Lincoln-Mercury Div. come out with such a model in the first place? Why are Buick, Oldsmobile, Pontiac and Dodge following suit?

"There's no reason to bring out a new car just because you feel you should have one," says Herbert Fisher, manager of Lincoln-Mercury's Market Research Dept. "And there's no reason to introduce one because your competitors have them, or because some manufacturing facilities are lying around idle."

Then what is the justifying factor? According to Mr. Fisher, it is having a new car "because some substantial unfilled consumer needs lie in wait for it."

"Me-Too" Won't Do—The important point seems to be the ability to convince the public of its "substantial unfilled need." This is where long months of market study come in. There were plenty of problems facing Comet before it came out last spring.

The company couldn't come up with a separate body shell for the Comet. This would have been too costly. The Falcon shell was bor-

Triumph Features Ease of Maintenance

ENGLAND'S TRIUMPH: New Triumph Herald coupe needs lubrication only about once a year. Body is made in seven separate replaceable units. Hood and fenders tilt forward for easy engine accessibility.

rowed. (The B-O-P compacts will use the Corvair body shell and the Dodge Lancer will use the Valiant shell.)

Comet product planners were hounded by this question: How can we use the Falcon body shell and still offer a car that isn't a "me-too," one that appeals to a different audience than the Falcon? This was the planners' guiding question.

Appeal of Its Own—"Our research has shown that the Comet has a quite different appeal," says Mr. Fisher, "attracting many new buyers to a Ford Motor Co. compact car who wouldn't have been attracted by the Falcon alone. Essentially, the Comet is adding buyers to the compact car fold who don't want a 'small,' small car, who are not looking for sheer utility, but who do want some greater luxury and flair within the definitions of the economy car class. As such the Comet is establishing its own unique value, its own reason for being, and is flourishing."

Mr. Fisher says this marketing concept guided not only product planners, but everybody who worked at putting the Comet before the public. Advertising men touted the Comet as a compact car offering more styling and size value than competitive compacts, and at about the same price.

PR to the Rescue—Public relations was especially important in preparing the way for the Comet since the Corvair, Falcon and Valiant, all brand new, were introduced six months before. Their job was to keep as many prospects as possible out of the market until the Comet came out.

Their efforts proved remarkably successful. Surveys show that 10 days before introduction, 43 pct of U. S. car owners had heard of the Comet and 2 pct had intentions of buying it, amounting to 120,000 intended purchases.

Mr. Ford's Teaser—Henry Ford II's statement in September, 1959, was a teaser that proved to be an important part of this public relations plan. His first official announcement of the car was brief.

Mr. Ford described it only as a car with "family size roominess and outstanding economy, together with the most graceful and elegant styling." He called it the "aristocrat of economy cars."

Launching a Comet—When the Comet was ready for launching, all activities were working around this "aristocrat of economy" concept. Mr. Fisher points to these as the essential activities involved in introducing a new car:

1. Franchising dealers. Not all Mercury dealers were given the Comet. Franchising was handled on a carefully selective basis.
2. Preparing and placing sales promotion material in dealer hands, including catalogs, fact books, posters, product films and window posters.
3. Preparing a traffic-building promotion. This involved the giveaway of 50 Comets in a sweepstakes contest and the registration of thousands of names of potential buyers.
4. Showing the Comet to dealers weeks in advance of introduction. This was done to generate dealer enthusiasm and to spell out clearly the product concept and sales story.
5. Training salesmen in the selling features with emphasis on the "greater Comet value at the same price."
6. Circulating information on parts and accessories and taking orders.

The Price Line — With this all done, the initial stocks of Comets were delivered to dealerships. Here is where an important tactic was used. Every dealer got at least one stripped-down Comet, the basic 2-dr sedan with not so much as a heater. In this way there was a Comet in every showroom with a price label under $2000. It was the quickest and most convincing way of dispelling any consumer notions about high prices, according to Mr. Fisher.

Tests Show New Engine is Better

CHECKS OUT: Test truck of GMC Truck & Coach Div. verifies electronic computer findings that new "Twin Six" gasoline engine is more efficient than previous "in-line" engines. Test run was made 10.7 pct faster, required 65 pct less gear shifting in truck with the new engine.

Precisely alloyed,
quality controlled, trouble-free:

FEDERATED "ENGINEERED" SILICON, ALUMINUM & MANGANESE BRONZES

For true-acting bronzes, specify Federated Herculoy Silicon Bronzes (excellent fluidity, tensile strengths up to 65,000 psi, yield strengths up to 35,000 psi); Aluminum Bronzes (tensile strength as high as 120,000 psi, after heat treatment); and Manganese Bronzes (as-cast tensile strength, up to 125,000 psi, exceptionally high hardness). Federated "Engineered" Bronzes are the end results of highly perfected production techniques and continuous quality control procedures developed by experienced metallurgists in Asarco's Central Research Laboratories. For complete data on Federated "Engineered" Bronzes, write or call: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y., or your nearby Federated sales office.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

FEDERATED METALS DIVISION

Where to call for information:

ALTON, ILLINOIS
Alton: Howard 5-2511
St. Louis: Jackson 4-4040

BALTIMORE, MARYLAND
Orleans 5-2400

BIRMINGHAM, ALA.
Fairfax 2-1802

BOSTON 16, MASS.
Liberty 2-0797

CHICAGO, ILL. (WHITING)
Chicago: Essex 5-5000
Whiting: Whiting 826

CINCINNATI, OHIO
Cherry 1-1678

CLEVELAND, OHIO
Prospect 1-2175

DALLAS, TEXAS
Adams 5-5034

DETROIT 2, MICHIGAN
Trinity 1-5040

EL PASO, TEXAS
(Asarco Mercantile Co.)
3-1852

HOUSTON 29, TEXAS
Orchard 4-7611

LOS ANGELES 23, CALIF.
Angelus 8-4291

MILWAUKEE 10, WIS.
Hilltop 5-7430

MINNEAPOLIS, MINN.
Tuxedo 1-4109

NEWARK, NEW JERSEY
Newark: Mitchell 3-0500
New York: Digby 4-9460

PHILADELPHIA 3, PENNA.
Locust 7-5129

PITTSBURGH 24, PENNA.
Museum 2-2410

PORTLAND 9, OREGON
Capitol 7-1404

ROCHESTER 4, NEW YORK
Locust 5250

ST. LOUIS, MISSOURI
Jackson 4-4040

SALT LAKE CITY 1, UTAH
Empire 4-3601

SAN FRANCISCO 24, CALIF.
Atwater 2-3340

SEATTLE 4, WASHINGTON
Main 3-7160

WHITING, IND. (CHICAGO)
Whiting: Whiting 826
Chicago: Essex 5-5000

IN CANADA: Federated Metals Canada, Ltd.
Toronto, Ont., 1110 Birchmount Rd., Scarborough, Phone: Plymouth 73246

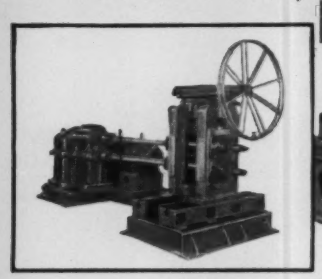
Montreal, P.Q., 1400 Norman St., Lachine, Phone: Melrose 7-3591

Whatever your requirements . . . SECO's staff of trained engineers can help you solve any special Mill problem you may have . . . from creative designing through installation (including *all* required auxiliary equipment).

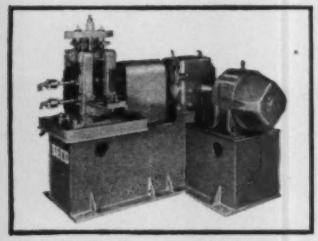
Should your problem involve a special Cluster Mill (to accommodate either ferrous or non-ferrous metals), or a Hot Rolling Mill that bonds non-ferrous metal to a steel base . . . SECO can supply.

Custom Built HOT ROLLING MILLS *by* SECO *assures* Predictable Performance

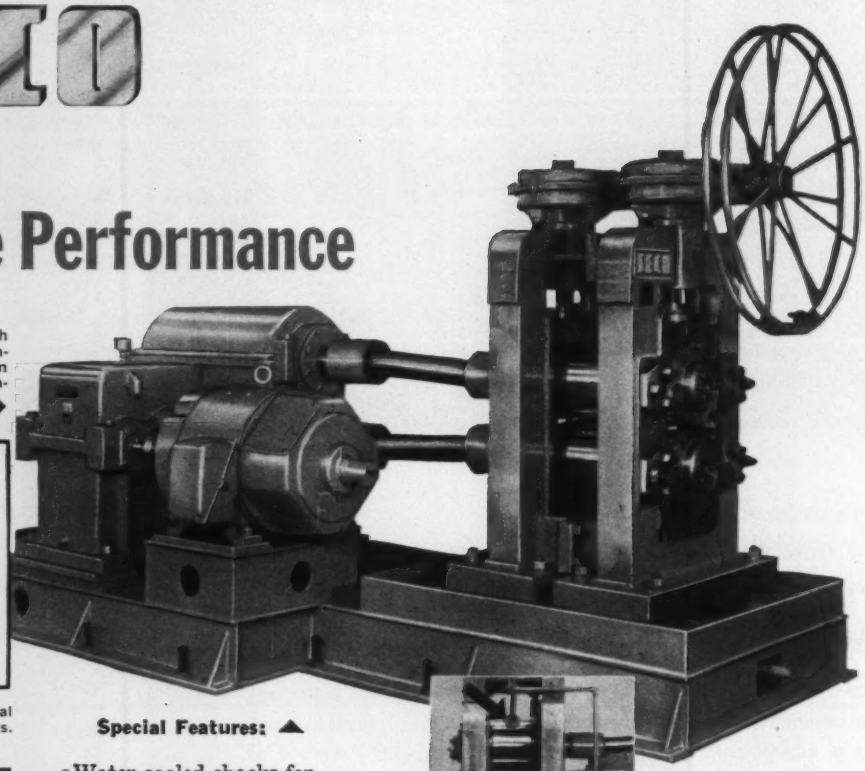
A special, custom-built 2-high Hot Roll Flattening Mill for non-ferrous metals. (Can be built in 2 or 4-high types or a combination of both.) ▶

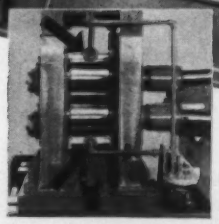


▲ A SECO designed and built Bi-Metal Bonding Mill on movable mountings.



▲ A 6-inch, 2-high Wire Flattening Mill for single or tandem use.





◀ Mill is equipped with two gas jets as a means for pre-heating rolls (see arrows).

Special Features: ▲

- Water-cooled chocks for lubrication
- 900° F. rolling temperature
- Hand wheel screw-down (adaptable for power)
- Special alloy steel rolls
- Timken Tapered Roller Bearings
- Can be built for 8, 10, 12 or 16-inch widths.

STEEL EQUIPMENT COMPANY

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SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

How Nixon Views Depreciation

Reform Has Top Priority for Likely GOP Nominee

The Vice President knows that depreciation reform gets a cool reception from many Congressmen.

He favors tax reform, but is not likely to press for corporate or individual cuts while emergency exists.—By G. H. Baker.

■ Depreciation reform in 1961 has been assigned a top priority by Vice President Nixon. If the Republican candidate for the White House has his way, Federal depreciation rules covering machinery and equipment will receive a much-needed revision by the Congress.

Tax reduction, either for individuals or corporations, is not in Mr. Nixon's tax plans—at this time. Although he is prepared to go all-out for depreciation reform, he believes lower rates on income must be held up until the Soviet Union shows both in word and deed that it is prepared to disarm.

Act Quickly — If Mr. Nixon is elected President in November, he expects to tell the new Congress early in 1961 just what he believes is necessary in the way of tax reform.

A Republican majority in both the Senate and in the House will naturally improve the outlook for the Nixon tax proposals.

Democratic majorities won't mean failure of the proposals, but the chances for reform of depreciation rules will be diminished.

Political Factors—Partisan quibbling over tax bills usually results in erosion of many points of merit to industry, such as depreciation reform, while increased exemptions for low-income individual taxpayers and other mass-appeal gimmicks are added to "sugar up" the tax plans under debate.

Some Democrats are talking openly of trimming rates for lower and middle-income taxpayers next year, and of sidetracking (on ground that it is "a handout to businessmen") depreciation reform.

Trouble Ahead — Mr. Nixon is fully aware of the financial pitfalls involved in recommending tax reform to the Congress. Regardless of which political parties control the Senate and the House next year, there's always the danger that irresponsible tax-cutting will shoulder aside the need for long over-due reform in such areas as depreciation of plant and equipment.

However, he believes that next year will be the proper time to recommend reform to the Congress, as there'll be a new administration, a new Congress, and the absence of election-year pressures. However, he warns that the darker relations with the U.S.S.R. of recent weeks demand use of the utmost prudence and caution in any move to cut the government's income.

The Conditions—"There can be no real tax reduction until the national and world situations have been assessed and we find it is clear that all revenue needs are being met and that tax reduction will be in the national interest," Mr. Nixon says. He spells out the following prerequisites for tax reductions:

1. All national security needs must be fully met.
2. Our ability to lead in the study and exploration of space must be unhampered by a lack of funds.
3. All national scientific requirements, both military and non-military, must be fully met.

Little Hope for Tax Cuts

■ Corporation and excise taxes will remain at current cold-war levels for another year at least.

Congress once again is going to hold the line against scheduled cuts in the corporate and excise taxes, due July 1. This will mean corporations earning over $25,000 a year will continue paying at the 52 pct rate.

Little Enthusiasm—Excise taxes on automobiles, auto parts, liquor, beer, cigarettes, and passenger travel will continue at present levels. There is some support among the lawmakers for repeal of the 10 pct tax on telephone rates, but it is not believed to be strong enough to produce a cut.

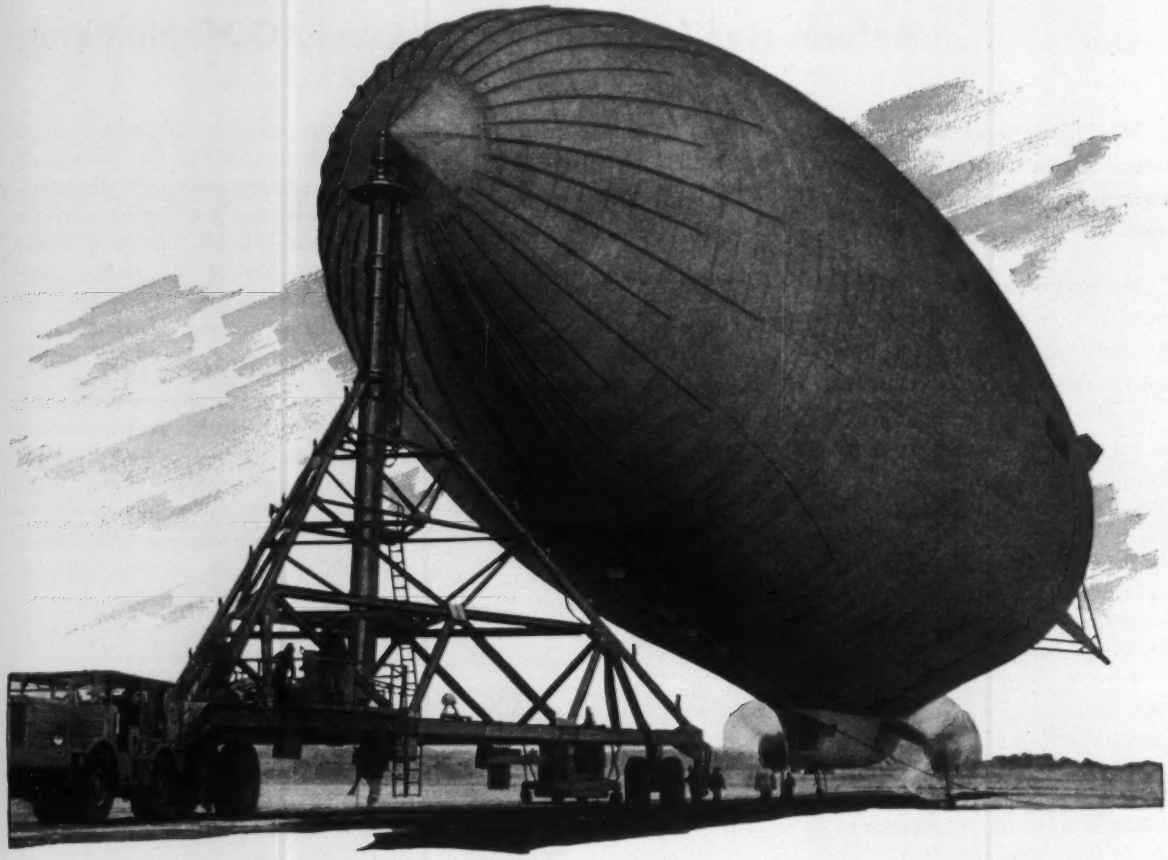
Taxes involved presently produce about $2.5 billion a year in revenue to the government.

Ike Asks Deferment—The Eisenhower Administration is asking that the scheduled cuts be postponed for another year at least. Collapse of the summit talks has strengthened its request.

The excise taxes have been in effect since World War II, although some have been cut from their highest levels. The corporation rate also dates back to the 1940s. The corporate rate would drop to 47 pct if not extended.

"Hitching Post" for Navy Blimp!

uses a 19-foot Saginaw b/b Screw!

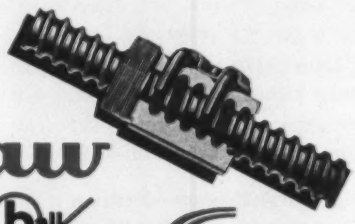


A Saginaw Ball Bearing Screw is located in the vertical column of these telescoping Goodyear Blimp Mooring Masts! The screw's extremely low friction and rapid positioning ability synchronizes the mooring fixture with the nose of the blimp to quickly and safely secure the Navy craft.

The huge high-efficiency Saginaw b/b Screw used here is over 19 feet long and with a B.C.D. of 6 inches. From the tiniest Saginaw Screw used in instrumentation, to this giant used in the Goodyear Mooring Mast, the principle of the Saginaw Ball Bearing Screw is almost universally adaptable. Its ability to replace acme screws and hydraulic devices *with over 90% efficiency* has already assured smoother, more dependable actuation for over 5,000 satisfied customers!

The Saginaw Screw may be able to improve *your* product's performance, give you greater power and maintenance savings, and lower your initial cost. Talk your actuation problem over with Saginaw's engineers. Just write or phone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan—*world's largest producers of b/b screws and splines.*

Actuation To Fit Your Individual Requirements
Have been built as small as 3/16 in. B.C.D. and 3/4 in. long, as large as 6 in. B.C.D. and 40 ft. long. Larger sizes can be built to your order.



Saginaw b/b Ball Bearing Screw

WORLD'S MOST EFFICIENT ACTUATION DEVICE

Are Coast Mills Ready to Grow?

Land Acquisitions Spur Expansion Rumors

Bethlehem and Columbia-Geneva have acquired land tracts adjacent to present plants.

Timetable indicates a new, integrated mill for C-G. Bethlehem may move with an H-Iron process.—By R. R. Kay.

▪ Rumors of big expansion plans of the West Coast steel mills are a continuing thing in the West. They gained new impetus recently with some significant land purchases in the Bay area.

U. S. Steel Corp.'s Columbia-Geneva Div. bought about 129 acres of vacant land adjacent to the company's present 1000-acre holdings.

Long-Range Plans—J. D. McCall, division president, would only say the land was acquired in connection with the division's long-range plans. An integrated Coast mill for Columbia-Geneva has been talked about for years. The time may be getting closer.

The Columbia action followed by several days official word that Bethlehem Steel's Pacific Coast Steel Corp. had purchased 575 acres adjacent to the company's South San Francisco plant.

H. H. Fuller, head of Bethlehem's Pacific Coast operations commented that the land was acquired "to provide for possible future expansion." The Bay Area facility employs 1300 people and covers 125 acres.

H-Iron Coming? — Best rumors associate Bethlehem's pilot H-iron plant in Los Angeles with the latest property purchase. The acquired land stretches to tidewater, important should the company need ore docks for an H-iron facility.

With San Francisco centrally located, the full-scale H-iron setup would be a natural for the area, many of the leading steel people believe.

While the talk is on possible expansion, current West Coast steel operations aren't booming as the year-end seers said they would. But the figures still point upward for the months ahead.

A 9 Pct Gain—A fresh estimate of 1960 shipments, based on current quarter data, indicates a 9 pct gain over last year. This would push the total slightly over the previous record hit in 1956.

The West's two best steel customers, construction and containers, are expected to beat 1959. This would more than offset losses in other industries.

Here's an authoritative industry-by-industry breakdown:

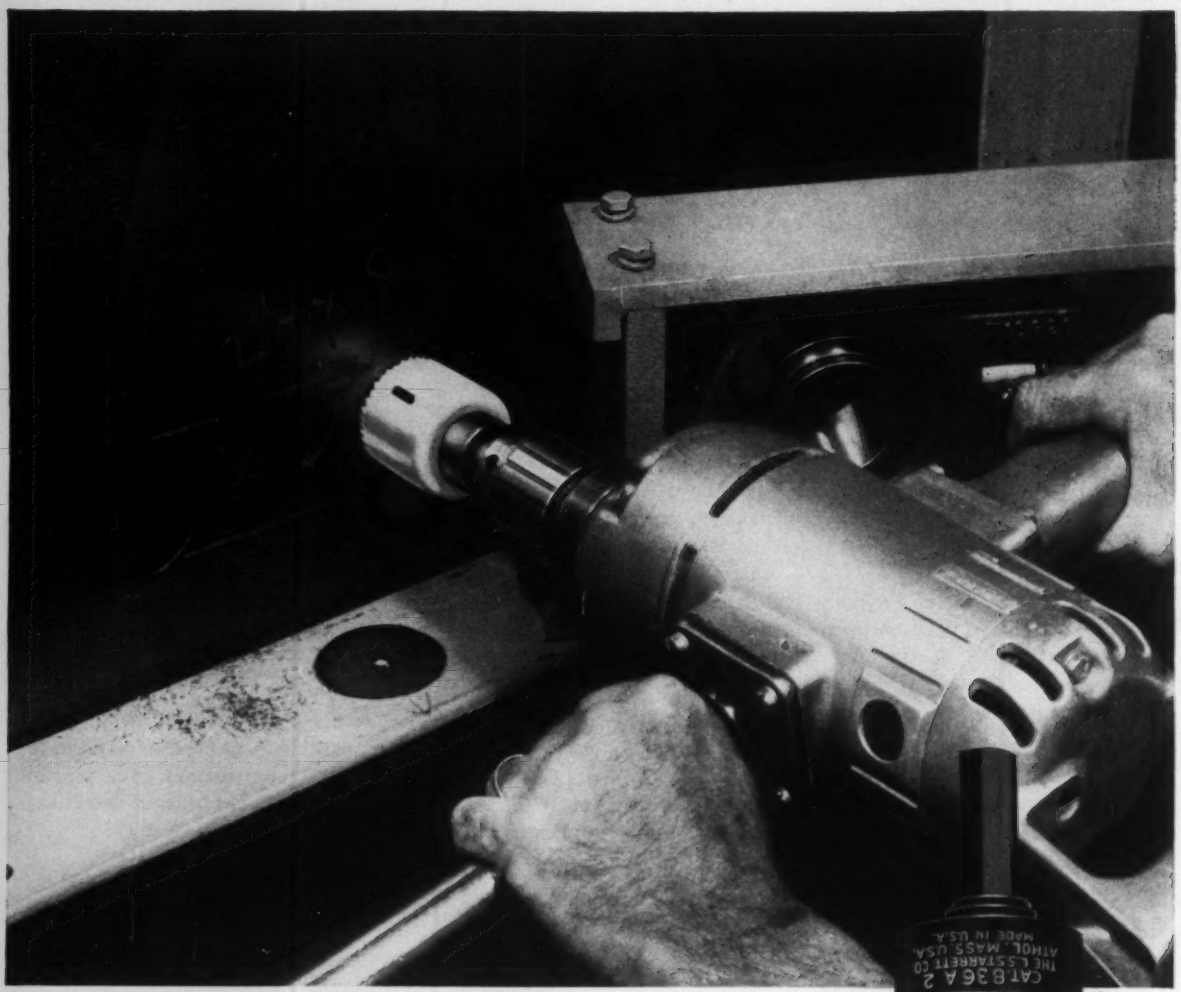
Residential Construction—Probably will slip about 16 pct. But gains in spending for additions, repairs and alterations will offset the dip in new construction.

Industrial Building—Expected to be up 20 pct. Stores, offices, should gain 5 pct. Church, school, hospital work should be up 18 pct.

Utilities—A modest increase for general construction. But pipeline projects should take a large tonnage of steel.

Missile Dome Chemically Milled

CHEM SIZED: Stainless steel missile dome, undergoing test for wall thickness, was brought into tolerance and made usable by Chem Size process developed by Anadite, Inc., South Gate, Calif.



Quickest, safest way to cut clean, round holes

STARRETT SAFE-FLEX® HIGH SPEED WELDED EDGE HOLE SAWS

Here's the quickest, easiest and least costly way to cut clean, round holes in any machinable material . . . in steel, brass, bronze, cast iron, aluminum, wood or plastics up to 1⅛" thick. Double welded to combine a high speed steel cutting edge, an extra tough shatterproof body and a rigid steel cap, these completely safe, virtually unbreakable heavy duty hole saws will handle high production cutting or the toughest maintenance jobs.

Starrett SAFE-FLEX High Speed Welded Edge Hole Saws are available in sizes from 9/16" through 6" diameter. Interchangeable arbors accommodate a wide range of saw sizes, come with ¼" pilot drill, 7/16" or ⅜" hexagonal shank or ¼" round shank for use in portable power tools, lathes, drill presses, radial drills and other machine tools.

Your nearby Industrial Supply Distributor has Starrett SAFE-FLEX® Hole Saws in the sizes you need ready for prompt delivery — also Starrett hacksaws, band saws and band knives. Call him for quality products, dependable service . . . or write for Starrett Saw Catalog. Address Dept. IA, The L. S. Starrett Company, Athol, Massachusetts, U.S.A.

Starrett®

World's Greatest Toolmakers

HOLE SAWS • HACKSAWS
BAND SAWS • BAND KNIVES

Starrett Precision Makes Good Products Better

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK • HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES

Builders Face Minimum Wage

Dept. of Labor Hearings First Step of Wage Review

Under Walsh-Healy Act, Secretary of Labor can set minimum wages on government contract work.

One source indicates a minimum of more than $2 per hour. —By R. H. Eshelman.

■ Informal hearings recently held in Washington by the Dept. of Labor kicks open the door to a full-scale wage review of the machine tool industry.

Purpose of this initial meeting, according to Nathan Epstein, of the Wage and Hour Div. was to study framing of questions for an industry-wide wage survey.

First Step—This wage survey is the first step in setting minimum wage standards under the Walsh-Healy Public Contract Act. Under this 1936 law, the Secretary of Labor is given the authority to determine prevailing minimum wages in an industry. This figure applies to work done on government contracts exceeding $10,000. But in practical effect, it would set minimum wages for the machine tool industry.

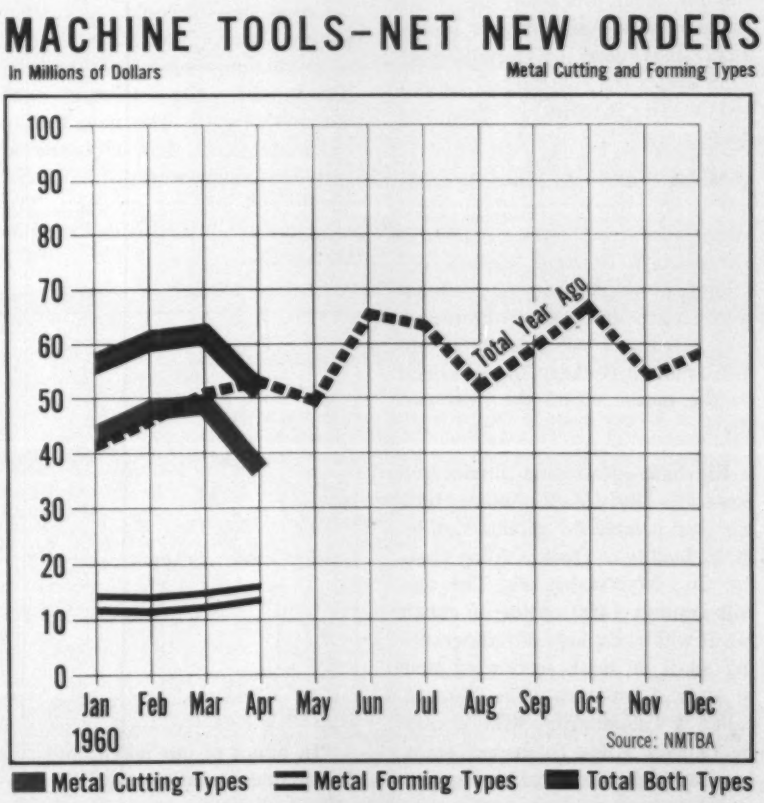
Although this is the first move to bring in the machine tool builders since the law went into force in 1936, some 50 other industries are now working under minimums established by the Secretary of Labor under its provisions.

Some Examples—For instance, office machine makers now have a minimum of $1.10 an hour, established in 1956. A new rate of $1.65 has been proposed. Recently labor unions asked that this be upped to $1.81 an hour. Pulp and paper now operates under $1.11½ an hour; proposed is a boost to $1.83. Aircraft has $1.05 now. The Secretary of Labor has indicated this is to be raised to $1.50 an hour.

The preliminary hearing was adjourned to give industry people invited to the hearing a chance to confer and gather opinions on the proposed wage survey procedure. The Labor Dept. indicates it expects this questionnaire to be readied for mailing to individual builders in about two months. In the meantime further hearings will be held to discuss the survey.

What's at Stake—At stake, according to one spokesman of the industry, is a considerable volume of government business. He notes that under vagaries of the law and amendments a minimum over $2.00 an hour might result. Builders trying to sell machines to the government would be under the further handicap of a minimum wage several times higher than the average wage of foreign competitors. Defense and other government officials in the past have shown no qualms about buying abroad, he adds. The Walsh-Healy Act, of course, stops at the water's edge.

According to the timetable outlined by the Labor Dept. representatives, however, six to ten months may well elapse before a bottom wage scale is set. And there's still a possibility of recourse to Federal Courts if the builders feel it's unfair.



INDUSTRIAL BRIEFS

In the Lab—The Carus Chemical Co., Inc., La Salle, Ill., has opened its new End-Use Research Laboratory. It will develop and evaluate processes using the company's products in the metalworking and metal finishing fields. The company is sole American producer of potassium permanganate.

Quadruple Production—Hercules Drawn Steel Corp., manufacturer of cold drawn steel bars, has begun operations in its new plant at 13900 Fullerton, Detroit. It has completed installation of a new drawbench permitting production of steel bars up to 3½" diameter. The plant will have four times the production capacity of the former Marysville, Mich. plant.

Process Shift — Saxonburg Ceramics, Saxonburg, Pa., has purchased the Johnson laboratory combustion boat and tube process from Crucible Steel Co. of America. The purchase included full rights to all manufacturing processes, use of the Johnson name, and current inventory. It is used by metallurgical laboratories for determining carbon and sulphur content in steel and other metals.

Moon Talk—A lunar systems activity has been formed by Ford Motor Co.'s Aeronutronic Div. It will manage its lunar capsule development program for the National Aeronautics & Space Administration. Ford will construct a 300-lb instrumented package to be landed on the moon within the next two years.

Big Sale—Radiation Engineered Services, Div. of Radionics Inc., has sold a huge 60 gamma radiography facility to Quaker Alloy Casting Co., Myerstown, Pa. The unit will contain 1400 curies of cobalt 60. It will be capable of radiographing an 8 in. thick section of steel in only 5 minutes. The camera, called a Gammatron, will be used by Quaker Alloy to inspect stainless and high alloy steel castings.

Date Set—A $1.2 million improvement and expansion program will be completed in July for the H. M. Harper Co., Morton Grove, Ill. Program includes construction of four building additions and new equipment for Harper's production of stainless steel alloys. A new Arc furnace installation has increased metal production capacity by more than 300 pct.

New Home—American Chain & Cable Co. has moved its Chicago district sales offices and warehouse facilities to 2040 North Hawthorne Ave., Melrose Park, Ill. These headquarters were previously located at 400 West Madison St., Chicago.

Spreading Out—The American Stamping Co., Euclid, O., is building an addition to its factory and has installed five new stamping presses including a 15,000-ton press. It is the second expansion since the factory was built in 1952. The new space will be used for expanding the company's welding and assembly facilities to provide more room for manufacturing.

Going Up—Reynolds Aluminum Supply Co. will have a new 38,000 sq ft aluminum-clad plant built in Jacksonville, Fla. Ground was broken May 16. The new facility will house more than a quarter of a million dollars worth of industrial metals and building products. The company is affiliated with Reynolds Metals Co.

"In honor of our lunch hour, I'd like to make a little toast!"

Get-Together — The Assn. of Iron & Steel Engineers exposition and convention will be held at Cleveland Auditorium, Sept. 27-30. An attendance of 15,000 steel plant supervisory personnel is anticipated. They'll review the latest products and services of nearly 200 steel industry suppliers, who will exhibit.

Stevens Seminar — New X-Ray techniques vital to space-age technology will be explored at Stevens Institute of Technology on June 7-8. The two-day seminar is sponsored by the college and General Electric Co. It will bring together 60 research and development scientists and engineers from industries throughout New York, New Jersey, Pennsylvania and Connecticut.

So Big — Barber-Colman Co., Rockford, Ill. will expand plant facilities for their automatic controls, air distribution products, overhead doors, and industrial instruments. The addition to the Park Plant will increase present plant area by about 170,000 square feet.

Under Way — A new and expanded sulfuric acid plant at Pittsburgh Chemical Co.'s Neville Island installation has begun production. It will boost Pittsburgh Chemical's capacity by 70 pct. The company is one of two merchant producers of sulfuric acid in the Tri-State area.

Merger — Solid State Electronic Controls, Inc., has been merged with its parent company, Controls Company of America. It will be operated as the new Electron Division and will continue the development and manufacture of semi-conductor devices.

R & D Teamwork—The Electric Typewriter Div. of International Business Machines Corp. has entered into a contract with Chemical Milling International Corp., El Segundo, Calif., for research and development work on application of chemical milling techniques to mass production of components.

Whether furnace output is measured in grams or tons, Hevi-Duty's value solution pays steady operating dividends.

When you consult a Hevi-Duty Sales Engineer on any heat-processing problem, you take three important steps toward a sound solution. For Hevi-Duty helps you three ways:

Designs the system to fit your need. A Hevi-Duty Applications Engineer works full time on such problems. Call on him. He might save you countless hours. He may have solved a problem like yours last week.

Designs the furnace to fit the system. Usually, the unit you need will be a proven item, for you are drawing from the most complete line of heat-processing equipment in the business. If not, Hevi-Duty engineers can quickly design the unit that fits your needs exactly.

Builds the furnace to last. Hevi-Duty furnaces are built for tough, continuous production work. They are designed to last, and hundreds of case histories prove they do.

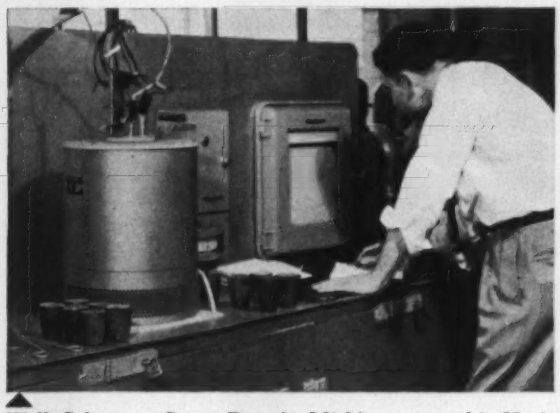
Here are three typical examples of non-ferrous melting furnaces spanning a wide range of sizes, yet each provides the value solution to a problem.

HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C — A Division of Basic Products Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.



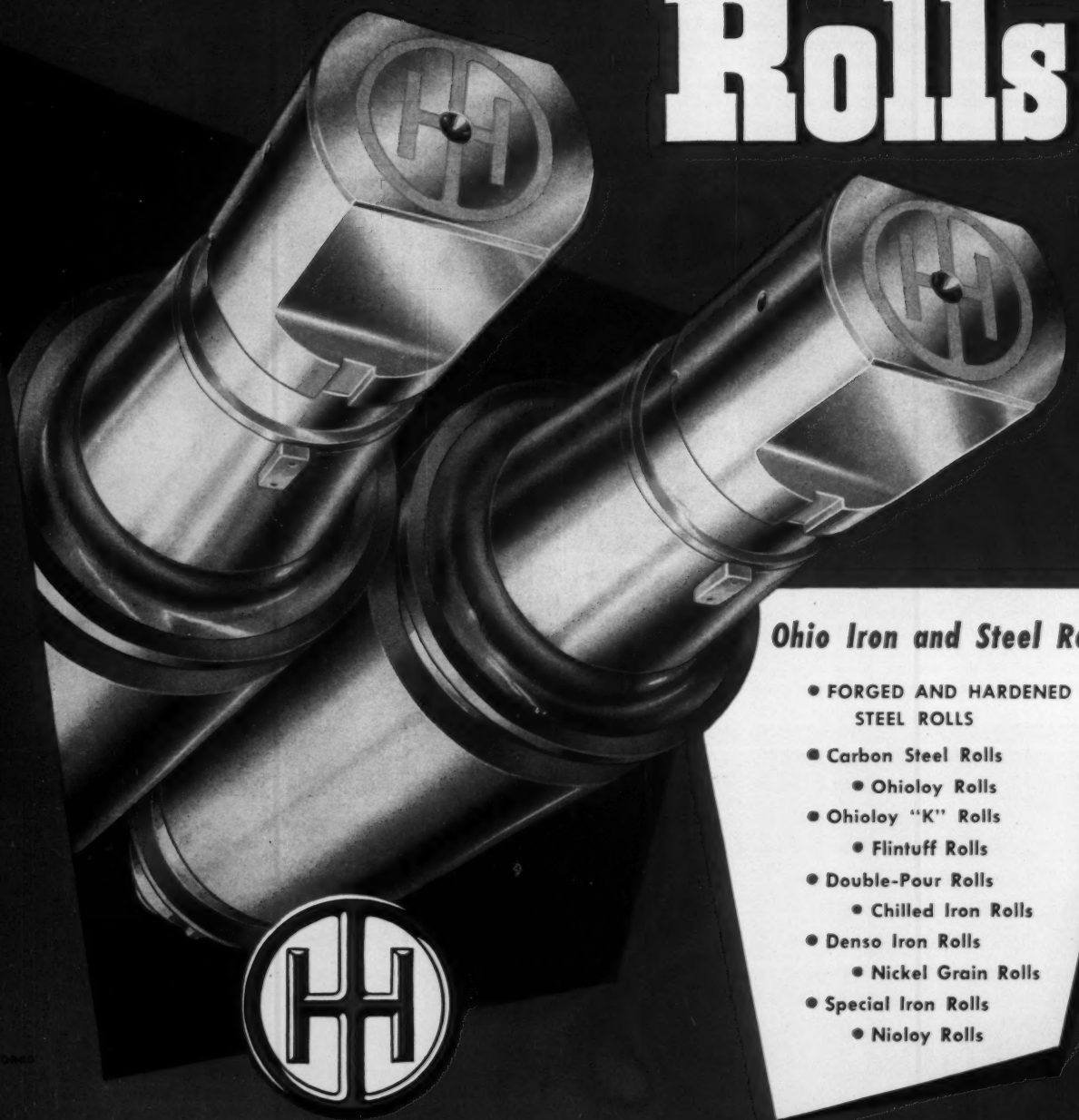
Wall Colmonoy Corp., Detroit, Michigan, uses this Hevi-Duty laboratory crucible furnace to find exact melting temperatures of hard-surfacing and brazing alloys. Furnace heats rapidly to the 2200° F. temperature required, provides precise control for melting and cooling tests on 250 g samples. User reports long element life at high temperatures. ***For more information, send for Bulletin 1246.***

This Hevi-Duty double-chamber, dry-hearth furnace melts 100 lb of aluminum per hour, 16 hours a day, 7 days a week at Alliance Mfg. Co., Alliance, Ohio. It can provide up to 200-lb-per-hour output and occupies little space. It maintains critical bath temperatures during charging. User states: "You can turn it on and forget about it." ***For complete information, send for Bulletin 593.***

Kawneer Company, St. Charles, Illinois, has installed a second pair of Hevi-Duty reverberatory furnaces for breakdown and holding in direct-chill ingot casting of four different alloys. Furnaces provide ± 10° F. control, pour at 1320° F., operate 24 hours a day. Capacity is 100,000 lb a day. Note in the foreground two of the 6,300-lb aluminum ingots produced. ***Please write for Bulletin 591.***

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY



Ohio Iron and Steel Rolls

- FORGED AND HARDENED STEEL ROLLS
- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

A. J. Berdis, becomes chairman of the board, Weirton Steel Co., Div. of National Steel Corp.

Lithium Corp. of America—**H. W. Rogers,** elected chairman of the board of directors; **H. D. Feltenstein, Jr.,** elected president and chief executive officer.

Reserve Mining Co.—**R. J. Linney,** elected president and a director.

Interstate Abrasives, Inc.—**W. N. Vanderhoof,** named president.

The Ferry Cap & Set Screw Co. —**D. J. Cantillon,** elected vice president, industrial sales.

Hanson - Van Winkle - Munning Co.—**G. M. Herring,** appointed asst. to the vice president, sales.

Walworth Co.—**M. H. Grove,** named chairman, executive committee and chief executive officer.

The Patterson Foundry & Machine Co.—**Joseph Epstein,** appointed vice president, manufacturand engineering.

Republic Steel Corp.—**A. A. Benson,** appointed asst. counsel.

The Yale & Towne Manufacturing Co.—**C. F. Burgman,** appointed legal counsel, international operations.

Pittsburgh Plate Glass Co., Paint and Brush Div.—**J. F. Green,** appointed general manager, Pacific Coast operations.

Vanadium Corp. of America—**W. J. Kaestner,** appointed manager, market research; **T. R. Burgin,** appointed asst. manager, market research.

Sturtevant Div., Westinghouse Electric Corp.—**H. W. Rainey, Jr.,** appointed marketing manager.

Keuffel & Esser Co.—**William Goldman,** appointed research supervisor, engineering equipment.

Minneapolis-Honeywell Regulator Co.—**K. R. Knoblauch,** appointed market sales manager, Industrial Products Group.

Republic Steel Corp.—**E. W. Carlson,** named manager, Buffalo district.

C. G. Tournay, elected president and chief executive officer, Weirton Steel Co., Div. of National Steel Corp.

Keuffel & Esser Co.—**J. M. Shodron,** appointed Midwest regional manager, Chicago headquarters.

Clark Bros. Co.—**J. H. Bews,** appointed manager, San Francisco branch office.

Amchem Products Inc., Metalworking Chemicals Div.—**L. C. Damskey,** promoted to sales manager, Midwest district; **O. E. Crisler,** promoted to asst. sales man-

(Continued on P. 53)

F. W. Chambers, elected president Strategic Materials Corp.

H. S. Harrison, elected president, The Cleveland-Cliffs Iron Co.

J. P. Kneubuhl, elected president, Research-Cottrell, Inc.

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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

(Continued from P. 51)

ager, Midwest district; **K. C. Kramer,** promoted to sales supervisor, Midwest district.

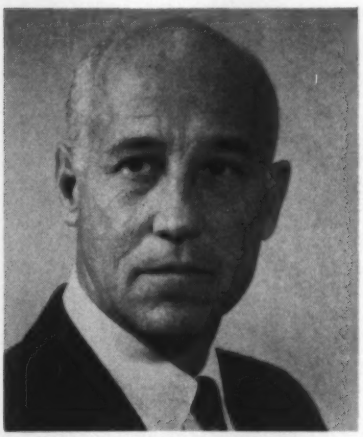
The Consolidated Vacuum Corp. —**L. B. Buraks,** named field engineer-in-charge, Washington, D. C., district sales and service offices.

M. G. Sendzimir, appointed president, T. Sendzimir, Inc.

Westinghouse Electric Corp.—**E. S. Goodwin,** appointed director, corporate purchases.

H. K. Porter Co., Inc., Leschen Wire Rope Div.—**R. K. Teske,** named Chicago district manager.

Reynolds Metals Co.—**R. N. Miller,** promoted to western traffic manager, Los Angeles headquarters.



T. P. Morgan, appointed director, operations, Consolidated Systems Corp., a Bell & Howell/CEC subsidiary.

C. J. Moore, promoted to vice president, marketing, Exide Industrial Div., The Electric Storage Battery Co.

Stromberg-Carlson's Commercial Products Div.—**E. P. Sykes, Jr.,** appointed director, marketing.

The Rust Engineering Co.—**O. W. Underwood, III,** named asst. to the president.

The Federal Steel Corp.—**K. C. Houston,** appointed manager, steel sales.

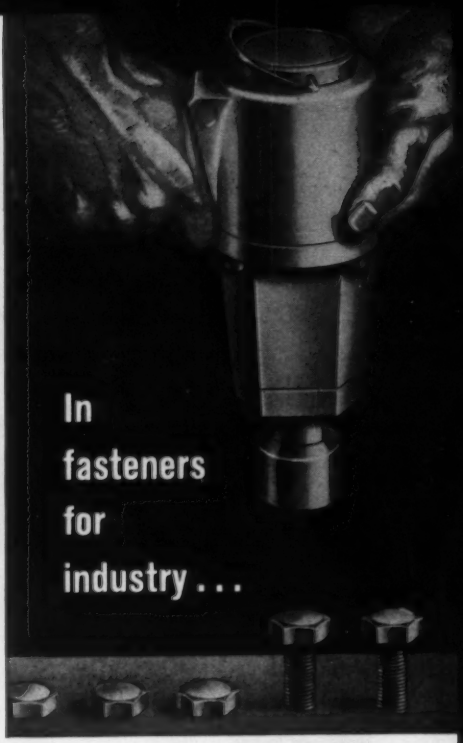
R. H. Wilson, appointed works manager, Riverside, N. J., plant, Riverside-Alloy Metal Div., H. K. Porter Co., Inc.

Conoflow Corp.—**N. R. Delaney,** appointed treasurer.

Sparton Corp.—**Dr. R. J. Rohr,** appointed manager, product research.

Standard Steel Corp.—**D. A.**

(Continued on P. 56)



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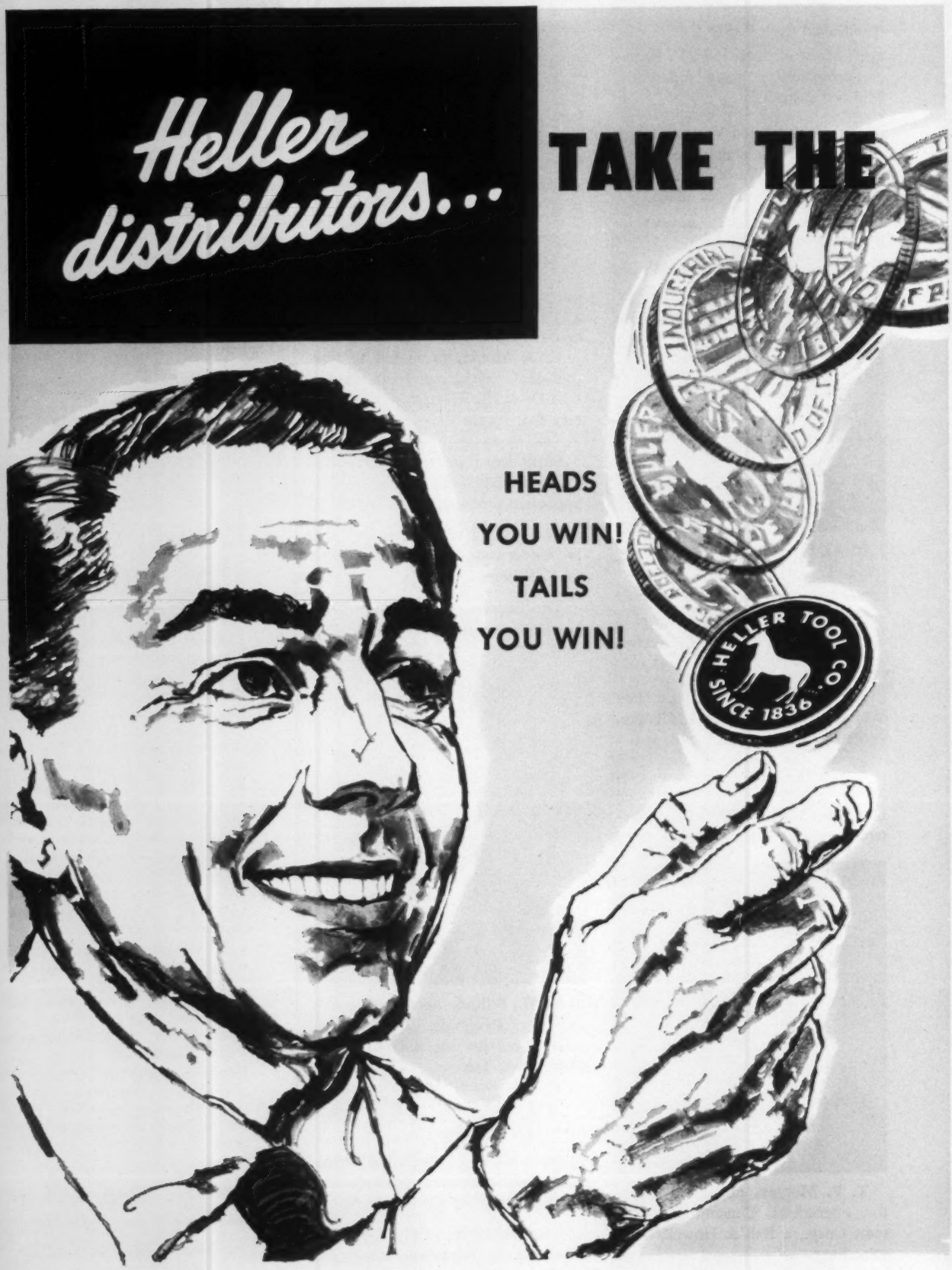
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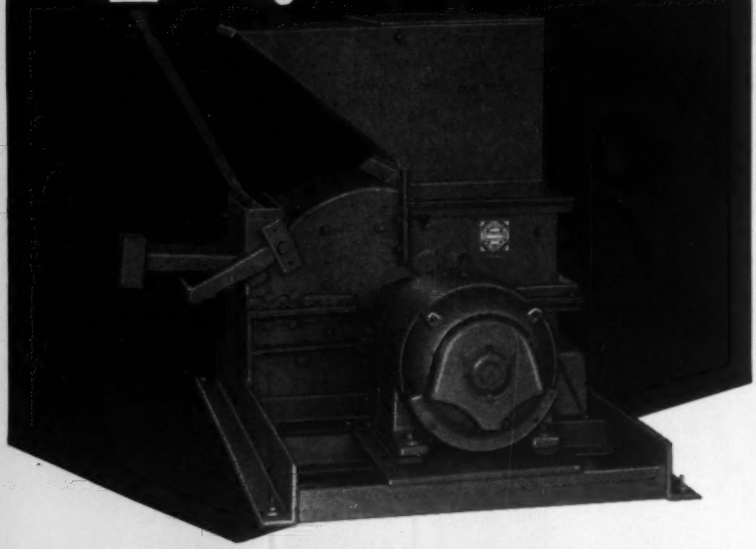

AMERICAN ROLLING RING METAL TURNINGS CRUSHER

Designed for the plant with a smaller volume of metal turnings. If your plant produces 20 to 200 tons of metal turnings monthly, the American 1800 Crusher will bring you additional profit on the sale of crushed turnings plus savings in cutting oil, man-hours, plant space, and tool maintenance.

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Write today for free literature on Model 1800 Crusher or for more information about the American Crusher best-suited to your needs!

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ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

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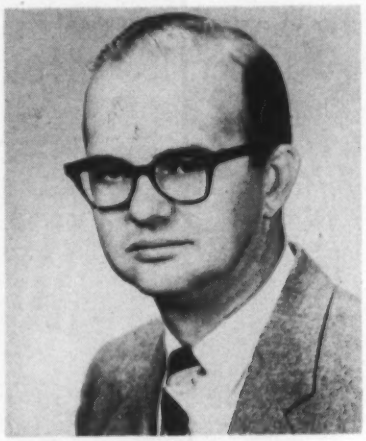
(Continued from P. 53)

Williams, appointed director, Research and Development Dept.; **L. F. Howard,** promoted to director, engineering, Cambridge Div.

M. J. Evans, named general manager, primary product sales, Alan Wood Steel Co., Conshohocken, Pa.



Arthur Marquis, appointed manager, specialty resistor project, Magnetic Materials Section, Metallurgical Products Dept., General Electric Co.

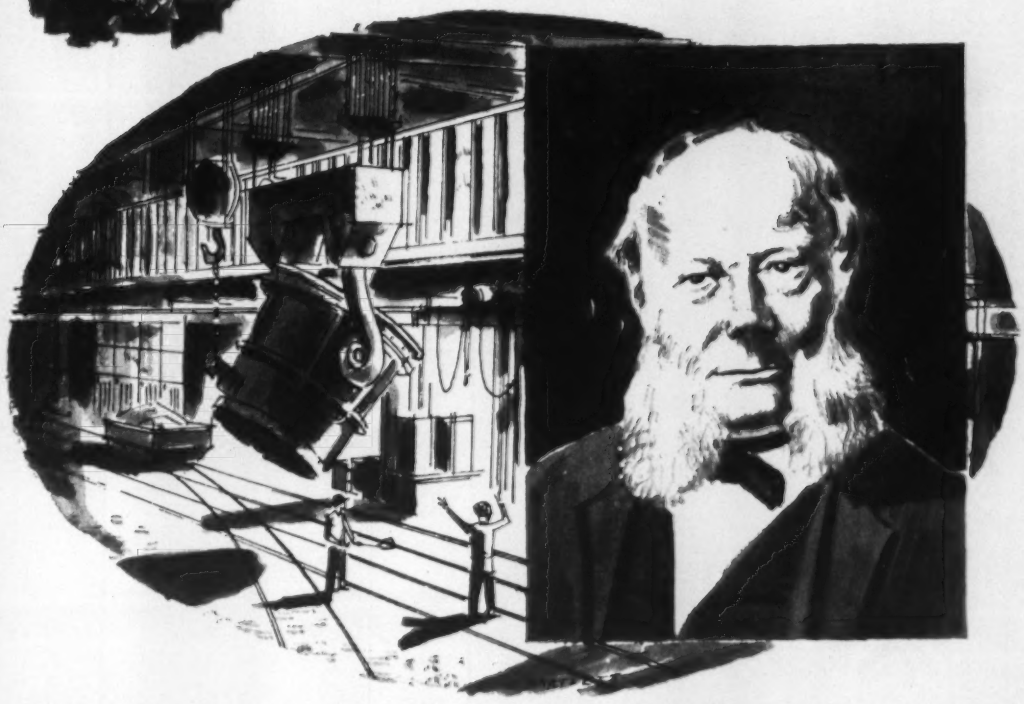
Wolverine Tube, Div. of Calumet & Hecla—**J. J. Boyett,** appointed sales representative, San Francisco district.

Blaw-Knox Co., National Alloy Div.—**Norman Naimy,** appointed sales engineer, Michigan area.

OBITUARIES

E. C. Smith, 69, chief metallurgist and director, research, Republic Steel Corp., Cleveland.

AMERICAN ORIGINALS IN IRON AND STEEL



Father of the Open Hearth Furnace

When Karl Wilhelm Siemens designed his regenerative furnace for glass manufacturing in 1861, he saw the possibilities of his furnace in the production of steel. Siemens granted a license to Pierre and Emil Martin of Sireuill, France, and in 1864 they built what is thought to be the first successful open hearth furnace.

Around 1867, J. T. Potts, Karl Siemens' engineer was building a regenerative furnace to melt crucible steel at the Anderson, Cook and Company plant in Pittsburgh. Assisting Potts was Samuel T. Wellman, an American engineer. Wellman was sent in 1869 to the Bay State Iron Works in South Boston, Massachusetts, to build the first successful open hearth completed in the United States. A furnace with five ton capacity went into operation early in 1870. The good news got around quickly. In 1871 a furnace was built in Nashua, New Hampshire, and at Singer, Nimick & Co., in Pittsburgh.

By 1909, open hearth production surpassed that of the Bessemer process, and today, despite more recent innovations, it remains the foremost process for production of steel in the world.

The first producer of dead-burned dolomite was The J. E. Baker Company. From the beginning, Baker's Magdolite and Jebcolite have offered iron and steel producers more uniform ingots and increased furnace efficiency with lower refractory costs. When you buy, be sure to specify Baker's Magdolite or Jebcolite. They are always 5 ways better . . . in composition, preparation, strength, economy and quality.

ANOTHER AMERICAN ORIGINAL

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BAKER'S MAGDOLITE
The original dead-burned dolomite

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Lights, camera, action

National Tube tests USS National Electric-Resistance Welded Pressure Tubing with sound waves. This ultrasonic weld inspection process is tougher than a Hollywood screen test.

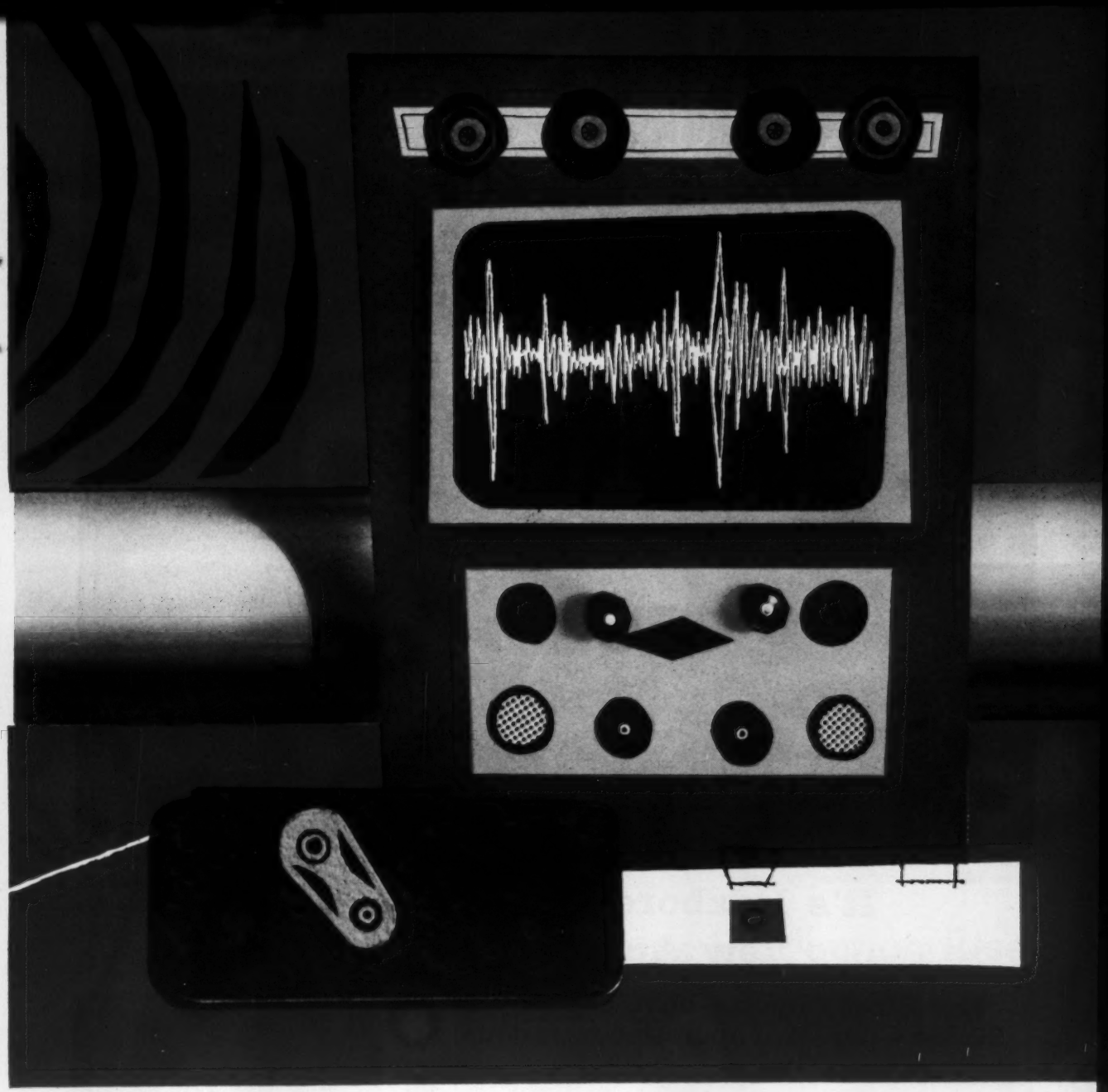
As the tubing slides directly over a ground quartz crystal, electrical pulses are focused on the weld area. The crystal changes these pulses into ultrasonic vibrations which bounce off the weld and reflect its strength or weakness. The vibrations are speared by the crystal, converted back into electrical energy, and floated across an oscilloscope screen.

If a bad weld is reflected, the electrical current dances wildly on the screen and triggers an alarm system. The crooked pattern is pen-recorded on a graph, a bullfrog-voiced horn croaks loudly, and the tubing is squirted with black paint to mark the defect.

In case the ultrasonic unit breaks down, a red-faced dome

Steel

This mark tells you a product is made of modern Steel.

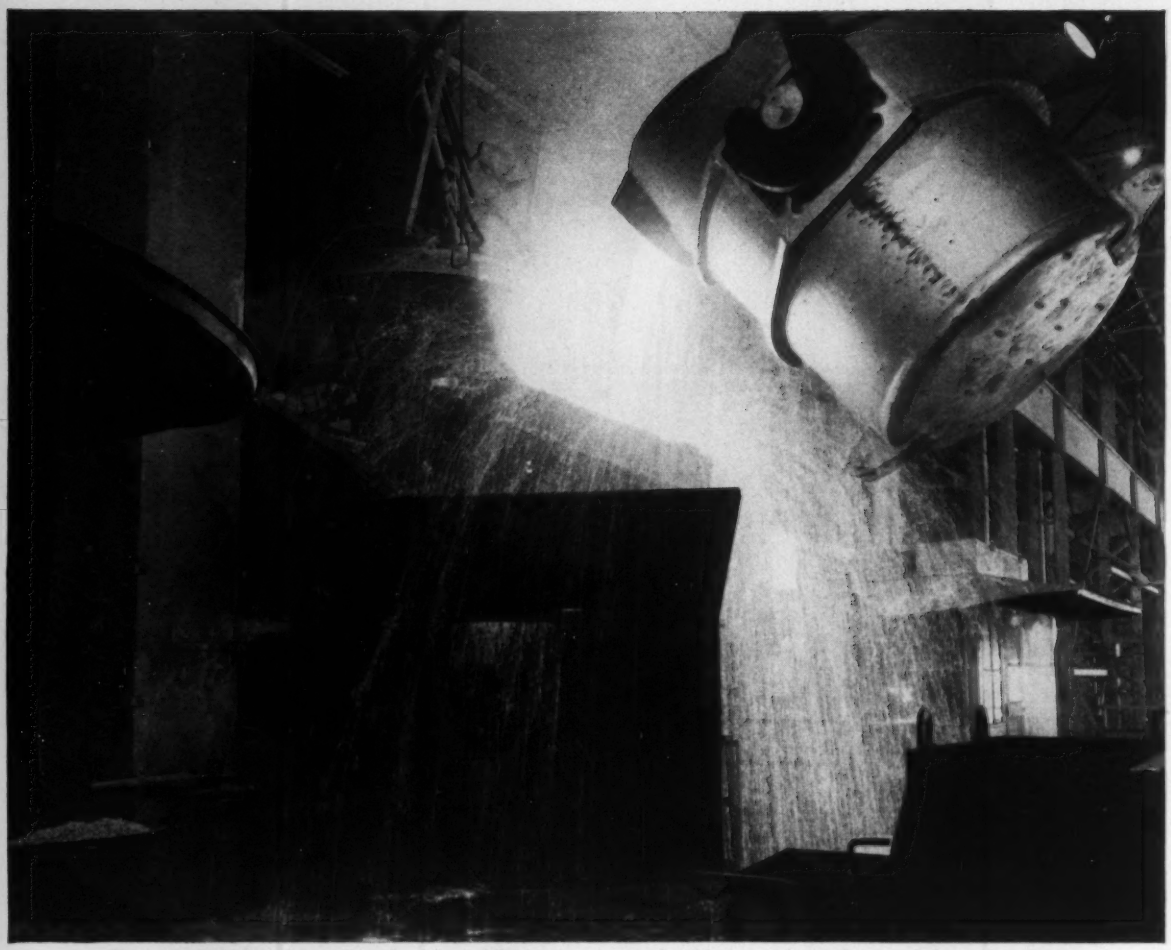


light automatically flashes, revolves and winks at the weld inspector. This blushing signal tells him that the unit needs to be repaired. It's added insurance that every length of tubing is completely tested before it leaves the plant.

Our inspection techniques are rigid. But they help us develop a high quality product for use in applications such as boilers, heat exchangers, condensers, superheaters, economizers and other types of heat transfer equipment. Consider USS National Electric-Welded Tubing for your next installation. Our trained Mill Service Force is available for field consultation. Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS and National are registered trademarks*

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York
United States Steel Supply Division



Seventy-ton ladle takes molten iron from Whiting continuous hot blast cupolas and pours it into converters.

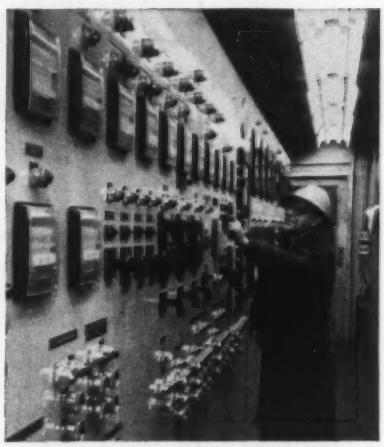
It's Foxboro control for giant new Acme steel plant

Hot Blast Cupolas have capacity of 50 tons per hr. – operate continuously

Cupolas 67 ft. high by 10 ft. in diameter – the world's largest – are under Foxboro control at Acme Steel's new 35 million dollar plant at Riverdale, Illinois.

To keep hot blast cupolas operating at peak efficiency, Acme depends on Foxboro instrumentation. Foxboro temperature, pressure and flow recorders and controllers to keep air leaving preheaters at a constant 1200F. And Foxboro Air Weight Controllers, that meter blast air by weight instead of volume, to help cut fuel costs.

Furnaces, cupolas, preheaters — you'll find Foxboro instruments help operate them all more efficiently. Ask your nearby Foxboro Field Engineer for recommendations for your plant. Or write direct for a copy of Bulletin 13-18. The Foxboro Company, 806 Neponset Ave., Foxboro, Massachusetts.



Small-case Foxboro Consotrol* instruments (foreground) record and control preheater pressures, temperatures, flows. Preheaters were designed by Fabricating Engineering Co., Inc. *Reg. U. S. Pat. Off.*

FOXBORO

REG. U. S. PAT. OFF.

Computer: Key to Predicting Blast Furnace Behavior

How does a blast furnace react to additions of oxygen, moisture and fuel?

Calculating the answer need not be a long and complex task —not when an electronic computer is handy.

■ Attempts to boost blast furnace performance and reduce costs have taken various routes in recent years. Techniques-tried run the gamut from new furnace designs to oxygen enrichment. Other methods will probably follow.

But how much do these new techniques help? How can changes in blast furnace operation be evaluated? Full scale testing is difficult and costly. Making predictions based on mathematical calculations is a long and complex task.

Does the Job Quickly — Now, calculations can be made—in a matter of minutes. And they are accurate too. They point up the way to improved blast furnace operation.

Key to this achievement is an electronic computer used with a mathematical model of a blast furnace. Its use was described at the recent general meeting of the American Iron and Steel Institute held in New York on May 25, 1960. The speaker was A. L. Hodge, associate manager, Gas Process Development, Linde Co., div. of Union Carbide Corp., Newark.

Studies made with the computer on 15 model blast furnaces indicate, Mr. Hodge reports, these possible gains: increased basic iron production by 25-30 pct; decreased coke rate by 200-400 lb per ton; increased calorific value of top gas to 100-115 Btu per cu ft.

Calls for Computer—All it takes are optimum conditions of oxygen enrichment, blast temperature, and fuel injection. This is where the electronic computer comes into play.

It performs literally thousands of calculations in a few minutes to aid in selecting and controlling most furnace variables.

To show the results of these computations, graphs have been prepared. With them, it is possible to predict effects of various changes in furnace operating conditions—such as oxygen, moisture, and fuel additions. This can be done before the need for many costly tests.

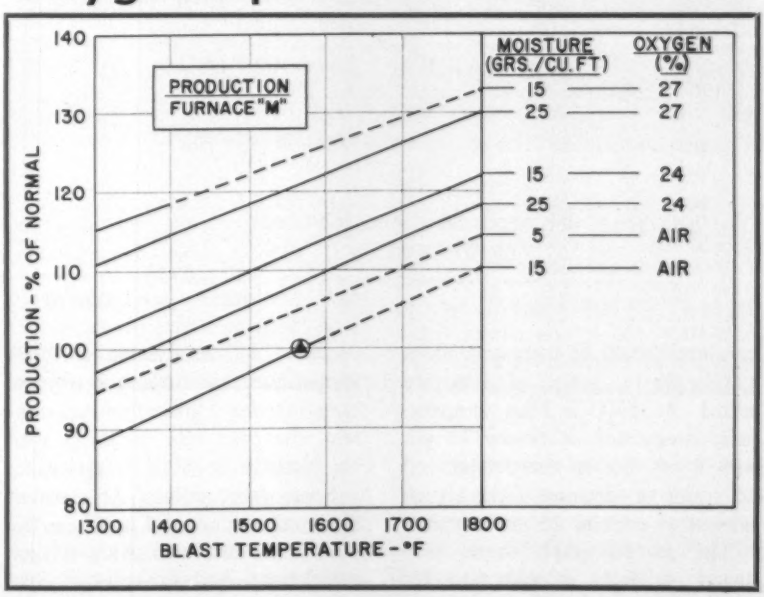
Graphs Are Guides—As labeled, the graphs are based on specific cases. Take care when using them to make predictions for other furnaces; every furnace has different traits. Nonetheless, these graphs will serve as qualitative guides.

The first graph shows the predicted production for furnace "M" as related to blast temperature, moisture content, and oxygen enrichment. Normal operating conditions for this furnace are: blast temperature — 1555°F; coke rate—1390 lb per ton; moisture—15 grains per cu ft. The large point on the graph represents the standard reference conditions.

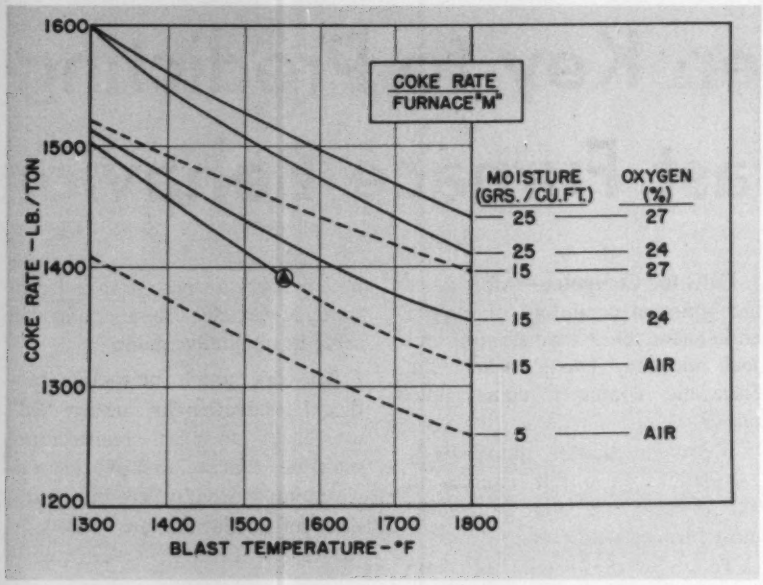
Note that six curves for different oxygen and moisture contents are plotted against blast temperature.

Needs Higher Blast—From the curves, these conclusions can be made for this furnace. To maintain constant production, the blast tem-

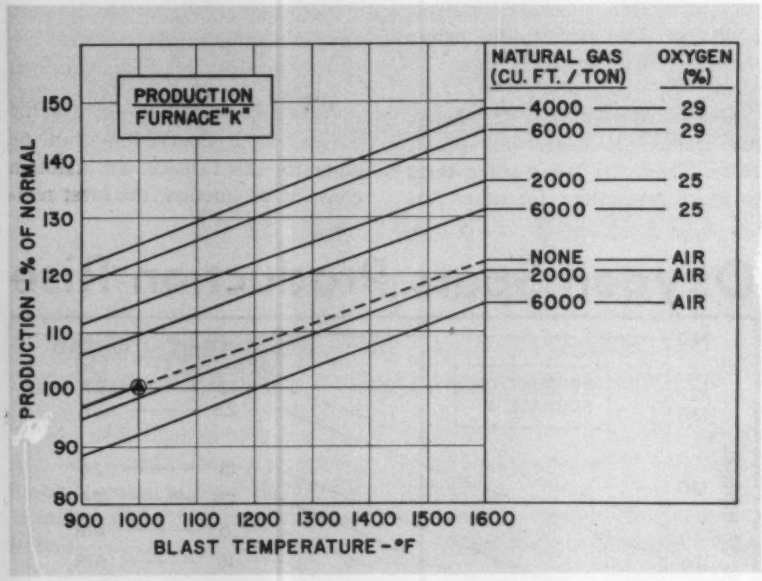
Oxygen Spurs Production Rise



How Moisture Lowers Coke Rate



High Blast Boosts Production



perature should be increased about 12°F per 1 grain of moisture added. At 1600°F blast temperature, production increases 22 pct with 6 pct oxygen enrichment and 25 grains of moisture. (Air is considered to contain 21 pct oxygen).

The second graph shows predicted variations in coke rates for furnace "M" as related to blast temperature, moisture, and oxygen. Note that for a given moisture content, the coke rate decreases with an increase in blast temperature.

Some other points: At constant blast temperature and moisture, the coke rate increases with oxygen enrichment. And, for constant coke rate, the blast temperature should be increased 21°F for each additional grain of moisture.

Uses Natural Gas — The third graph points up the effects of natural gas when used in place of steam. Normal operating conditions for this furnace were: blast temperature—1000°F; coke rate 1585 lb; and 4 grains of moisture.

Conclusions that can be drawn from this set of curves include: To maintain constant production at constant wind, the blast temperature should be increased about 30°F per 1000 cu ft of gas injected per ton. (Coke rate decreased about 10 lb.) Production increases about 10 pct with 1300°F blast temperature (300°F increase) and 2000 cu ft of natural gas per ton.

What happens when oxygen is added? Production increases about 30 pct with 1200°F blast temperature (200°F increase), 6000 cu ft of gas and 8 pct oxygen enrichment.

A. L. Hodge adds at this point, "In actual tests run with natural gas, or other fuel injections, we find that production results in several cases have been greater than expected. This is usually attributed to the furnace using more useful wind."

Gives Low Coke Rates — The next graph shows the coke rate for furnace "K." "The immediate point of interest in this plot is the extremely low coke rates attainable with natural gas injection."

At 1000°F for example, each 2000 cu ft of natural gas decreases the coke rate 95 lb. Production decreases about 2.5 pct.

But at 1400°F, the coke rate decreases to 1330 lb with 6000 cu ft of gas and 8 pct oxygen enrichment. In this case, production increases about 37 pct.

"The most important aspect about this last graph is the very significant decrease in coke rate under almost any condition of operation whether with oxygen enrichment or with straight air blast."

Produces Gas — One point to remember is that the blast furnace

Here's Quick Comparison on Predicted Values

Test Period No. of days	Normal 123	I 34	II* 3	III 4	IV 16	V* 6	VI* 6	I, III, IV, Avg. 54
Operating Conditions:								
Oxygen, pct	20.96 (air)	23.1	21.7	23.5	23.0	22.2	21.1	23.0
Wind, cfm	76,572	75,180	76,020	75,000	72,020	73,517	73,700	74,230
Blast Temp., °F	1367	1214	1332	1369	1301	1302	1294	1251
Moisture, grains/cu ft	13.4	14.7	16.1	20.0	17.7	15.2	15.3	16.0
Measured Values:								
Production,(actual), tons/day	1523	1604	1551	1663	1561	1520	1470	1596
Coke (actual), lb/ton	1392	1457	1436	1406	1416	1374	1369	1441
Calorific value top of gas Btu/cu ft	85	100	—	—	—	—	—	100
Predicted Values:								
Production, tons/day	—	1588	1545	1625	1577	1540	1478	1585
Coke, lb/ton	—	1460	1429	1440	1450	1405	1420	1455
Calorific value, Btu/cu ft	—	98	95	105	103	96	93	99
Difference of Predicted Values from Measured, pct								
Production, pct	—	−1.0	−0.4	−2.3	+1.2	+1.3	+0.5	−0.7
Coke, pct	—	+0.3	−0.5	+2.3	+2.4	+2.2	+3.7	+1.0
Calorific value, pct	—	−2.0	—	—	—	—	—	−1.0

* Periods of intermittent oxygen enrichment.

is essentially a gas producer. Other data show how net fuel gas credit varies with the blast temperature, natural gas injection, and oxygen enrichment.

For example, net heat for credit decreases with an increase in blast temperature. "This is due to a lower coke rate and more fuel gas required by the stoves."

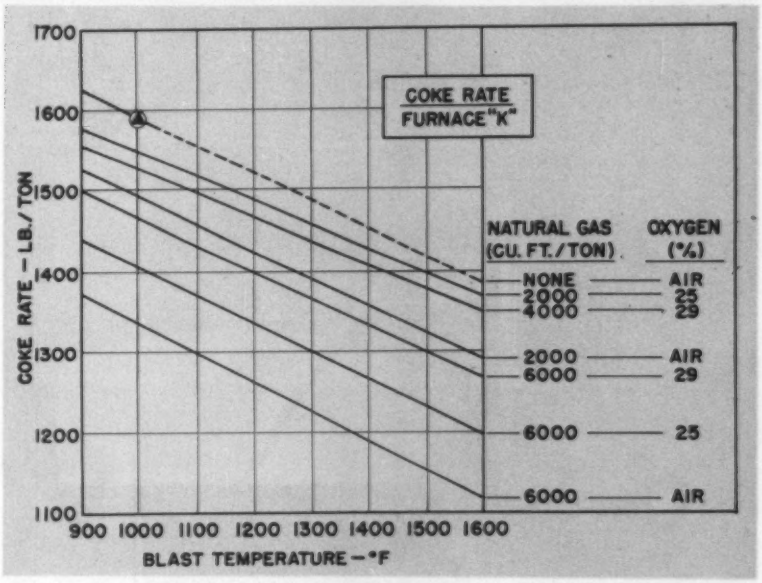
For each 2000 cu ft of natural gas injected at a constant blast temperature of 1100°F, the net heat for credit increases a million Btu. Thus, the extra top gas heat should offset about half the cost of fuel injected.

How About Top Gas?—Hodge also mentioned that since the blast furnace functions as a high temperature gas producer, much can be learned about the nature of the process from changes in its top gas.

Another graph, not reproduced here, considers top gas temperature changes. It shows the relationship for a furnace "L" in which the variables are oxygen, blast temperature, and moisture. Normal operating conditions are 1490°F; coke rate, 1350 lb; 5 grains moisture.

When moisture is added at constant blast temperature, the top gas temperature increases. With constant moisture and blast temperature, the top gas temperature decreases as oxygen is added.

Natural-Gas Means Less Coke



Results Are Accurate — What about accuracy of predictions made with graphs? In several cases, it has been possible to compare predicted results with actual furnace test data.

Results show that predicted versus measured results correspond closely. The table shows that there was less than 4 pct variation in six specific periods using an oxygen enrichment test when comparing production, coke rate, and calorific value of the top gas.

Mr. Hodge continues, "The general results shown are intended to present only a sample of the many possibilities made available by computer model techniques."

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

New Brick Boosts Furnace Life

Molten aluminum can be very damaging to furnace refractories. The metal, in turn, becomes contaminated.

Recent tests reveal a new brick to be highly resistant to attack and abrasion.

■ Results of a long term development program have been labeled "a major breakthrough in refractories."

Reported to be highly resistant to severe conditions imposed by molten aluminum alloys are two new types of brick and a companion mortar.

Named Lo-Sil and Lo-Sil Super, the bricks were developed by the Kaiser Refractories & Chemicals Division of Kaiser Aluminum & Chemical Corp., Oakland, Calif.

Serves All Needs—Lo-Sil Super bricks have been recommended for the most difficult jobs; Lo-Sil is being offered for use under less severe conditions. The new mortar can be used with either of the bricks.

The need for these products has grown with the demand for more and better quality aluminum. This trend calls for refractory bricks that can effectively resist attack by the molten metal.

Molten aluminum, particularly in the high performance alloys, damages the linings of reverberatory furnaces through chemical attack on the silica contained in the refractory. The silica, in turn, contaminates the aluminum alloy.

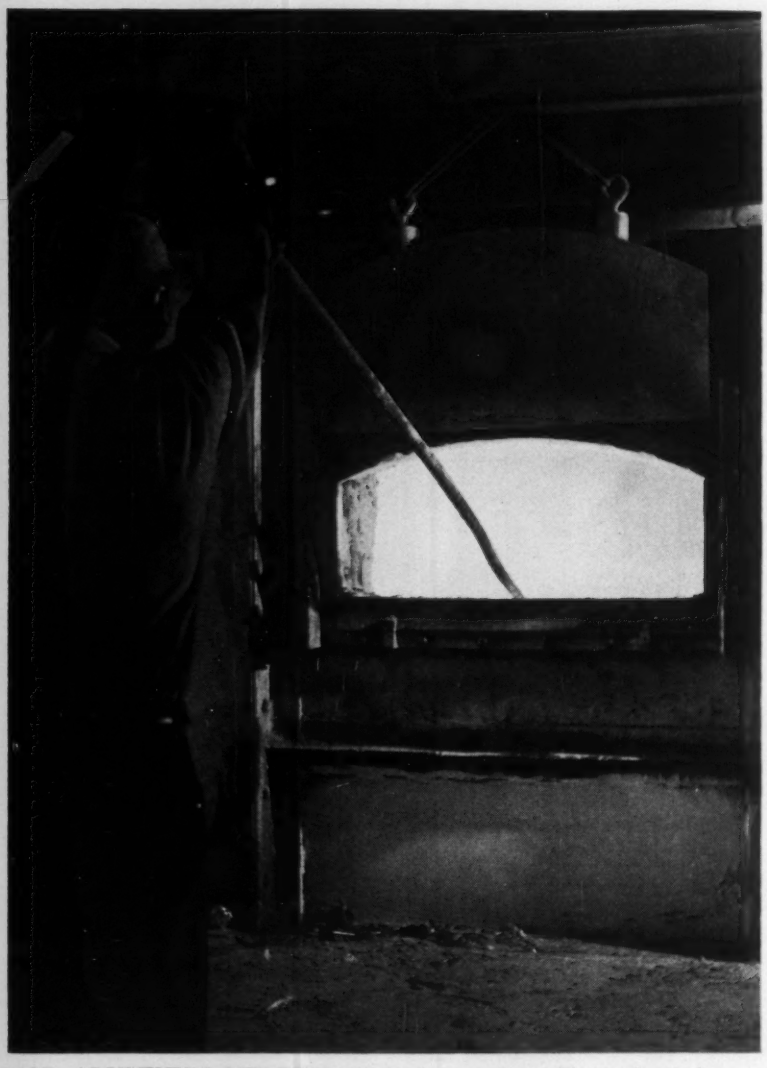
Special Formula — W. Basil Leach, vice president of sales, points out that the very high resistance of the new refractory to metal attack is due to its special formulation. The low silica content of the Lo-Sil Super brick is also a key factor.

The brick also withstands penetration. This means that dross can be easily cleaned off the lining. Thus, an operator reduces downtime when changing from one alloy to another. Lo-Sil Super also resists abrasion, and the impact and thermal shock resulting from a heavy charge of cold metal.

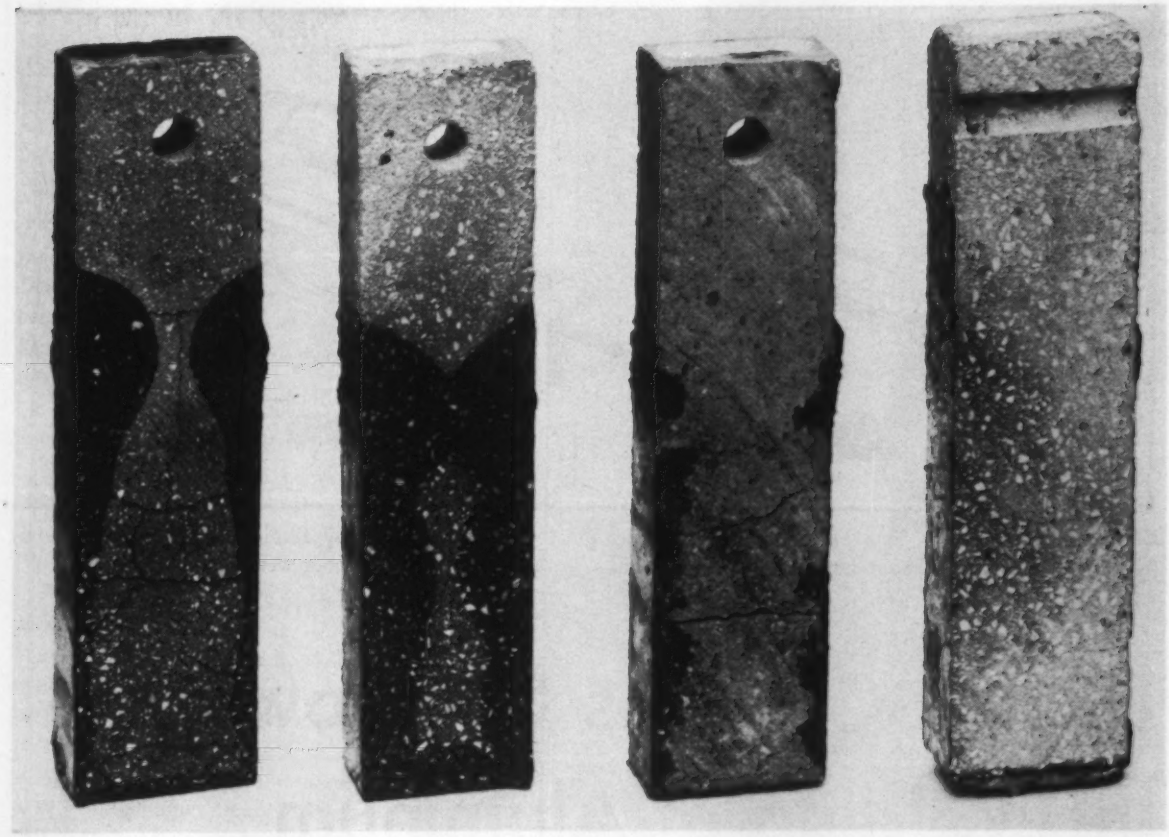
Tests by Immersion—Lab tests highlight the improved performance of both refractories. Comparative brick samples were partially immersed in molten 7075 aluminum alloy at 1400°F.

Standard brick was attacked to a depth of 1¼ in. in only six days. After 30 days of continuous immersion no attack could be measured on the Lo-Sil Super brick; there was only minor evidence of attack on the Lo-Sil.

The new mortar is formulated like the brick. Hence, it resists attack as well. This mortar can be used in either a dip or buttering consistency. It develops good strength at normal aluminum melting furnace temperatures.



FOR ALUMINUM MELTING: Kaiser's new low silica refractories are specially designed for use in aluminum reverberatory and remelt furnaces.



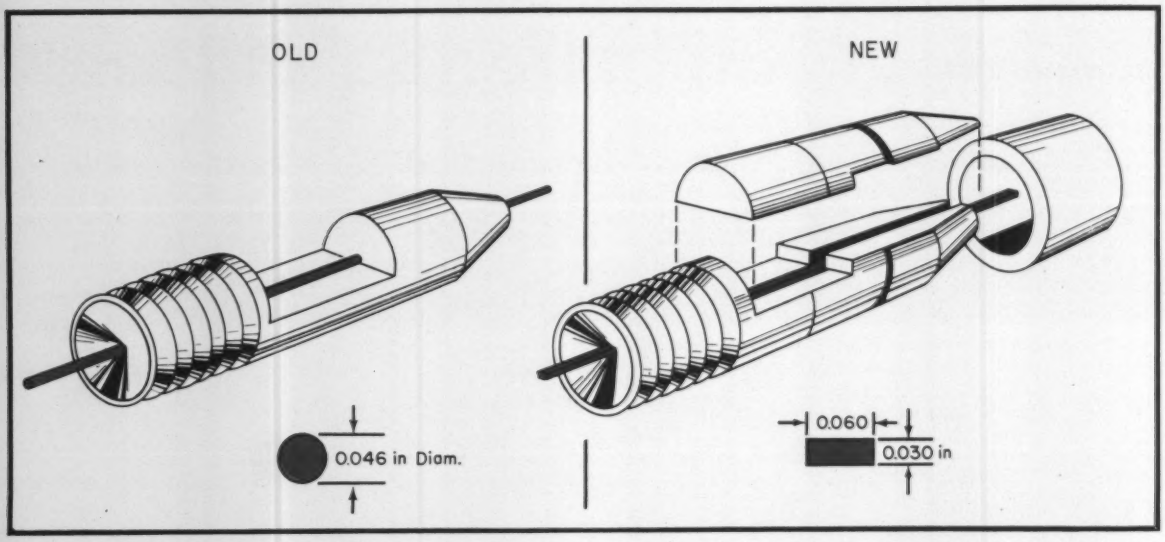
RESISTS PENETRATION: After immersion in molten 7075 aluminum alloy for periods up to 30 days, three brick samples (left) show varying amounts of attack. The new refractory (right) shows almost no penetration.

Compares in Service—A recent installation points up the effectiveness of the Lo-Sil Super brick. The new bricks were put in a melting hearth at Kaiser Aluminum's Trentwood, Wash., works to check their performance against the standard brick.

Core samples showed that one inch of attack occurred in the standard refractory during the processing of every 3 million pounds of metal. Nine inches of attack occurred in 185 days. During the same period, the Lo-Sil Super bricks were attacked to a depth of only ⅞ in.

Moreover, Kaiser officials point out that if the hearth had been completely lined with the new bricks, silicon pickup in the metal would have been one-twentieth that encountered from using the standard brick.

NO SHOCK PROBLEM: New bricks for aluminum melting furnaces are highly resistant to thermal shock caused by charge of cold metal on hearth.



CURRENT PICKUP: New expandable contact tip (right) provides much better current pickup than old style tip (left), thereby eliminating one of the causes that often results in poor welds.

Design Changes Cut Downtime In Welding of Aluminum

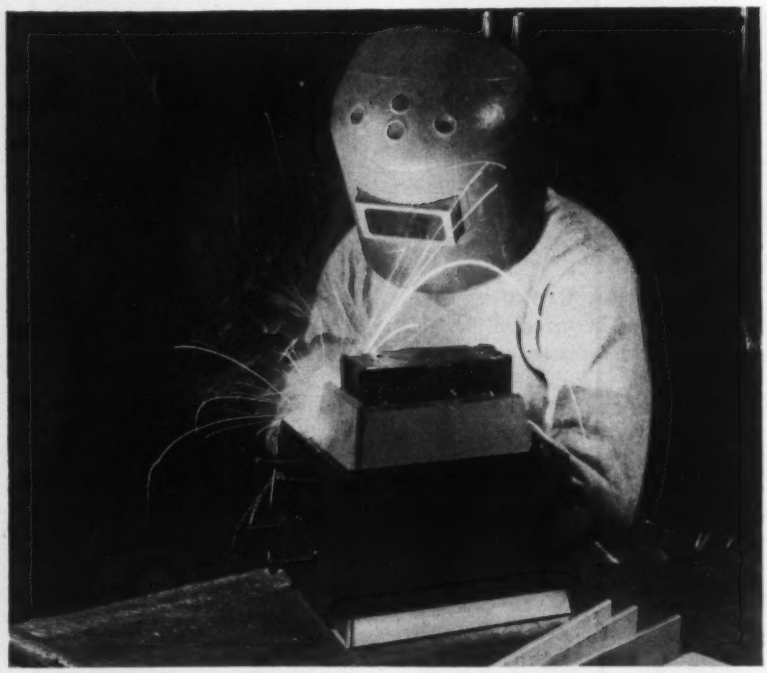
By altering the contact tip and the wire, one company is now adding hours to its aluminum welding lines.

The changes have done away with time-consuming downtime.

■ If you want to get the attention of welding people, just mention the word "aluminum." Here's a metal that, compared to steel, is still in its infancy. Industry maintains a constant watch on any new developments in the welding of aluminum.

Basic thinking has paid off at one plant where aluminum welding is used to fabricate large radar antennas and missile tracking devices. This plant had a burn-back problem. In other words, the aluminum filler wire would fuse to the contact tip of the welding gun.

Every time burnback came into play, the welder had to stop weld-



SWITCH TO FLAT WIRE: There's a better contact surface for the feed rolls with flat wire. It stops burn-back problem and feeds smoothly.

ing and take the gun apart. Then the feed rolls had to be untangled. The machine had to be re-threaded. Finally, the welder replaced the contact tip. But these time-consuming maintenance steps cut right into valuable welding time.

Common Sense — The big solution to this problem at the Ordnance Dept. of General Electric Co., Pittsfield, Mass., was based on design factors. Two changes in the welding setup now offer a saving of one hour per day per welder. And this department of G. E. employs 30 welders.

One change is a new expandable contact tip. And the other makes use of flat, rather than the traditional round, welding wire.

A specialist in G. E.'s Advance Manufacturing Engineering, C. L. Rundell, invented the new tip. Welders besieged the engineers with complaints about their burn-back problems. Mr. Rundell found a simple solution. Why should the welder take the whole gun apart? Why not just remove the tip, clean it, then put it right back in service?

In Sections—The new tip is made in two pieces—held together by a silicon rubber band. This invention results in current pickup the entire length of the contact tip.

Chips and dust, created by the drive rolls, cause standard tips to plug. The new split tip opens and closes, permitting these same chips to pass through without breakdown. Any variation in wire size is compensated for by the new tip.

Now, the welder just takes the tip apart (instead of the whole gun) and cleans it with a knife file. This removes the coating of aluminum oxide inside the tip. Such coating is one of the main obstacles to good current pickup.

Same Size, New Shape — The Ordnance Dept. finds that flat wire contributes to the success of its consumable arcwelding practice. The wire is nothing more than conventional 3/64-in. diam wire flattened at the mill to 0.030 x 0.060 in. size.

INVENTIVE MIND: G. E. engineer C. L. Rundell examines his new expandable contact tip (in place in a welding gun).

Flat wire provides a greater area for current pickup. As proof, compare the very fine contact point on round wire to the much larger concentration available on flat surfaces.

Flat wire also adds more driving surface for the feed rolls, eliminating the chance of slippage. Any time you weld with small diameter wire in a pull gun (where feed rolls are smooth), the rolls become tight. So tight, in fact, that round wire tends to flatten anyway. A standard tip causes fits that are even tighter.

Since the new contact tip is 0.010 in. wider than the wire itself, you get a sensible tolerance. Wire thickness, on the other hand, doesn't present a problem at all since the tip expands in that direction.

Cheaper Wire—Formerly, G. E. ordered a super clean aluminum wire. It was costly. It ran about 60¢ lb more than standard wire. Each breakdown added up to some 30 minutes in maintenance repair. Then there were re-work and X-ray costs, plus the costs of processing rejection reports.

Cost of manufacturing these tips has also been reduced at G. E. They're now cast in beryllium copper using the lost wax process.

Information received from the weld samples using flat magnesium wire is favorable, too. Current pickup problems in magnesium are even more crucial than in aluminum. But it's still a little early to make any positive statements concerning the magnesium picture.

Vacuum Furnace Brazes Parts At Temperatures to 4500°F

By Mel Schwartz—Senior Mfg. Engineer, The Martin Co., Baltimore

High heats are needed to determine the interstitial element in refractory metals.

A new vacuum furnace fits the need. It operates at temperatures up to 4500°F—at pressures in the 0.1-micron range.

▪ Designed for sintering, brazing, heat treating and annealing, a new resistance-type furnace operates at temperatures up to 4500°F with pressures in the 0.1-micron range.

This internal-element vacuum furnace has no non-metallic refractories inside the vacuum chamber —except for the thermocouple and power feed. Metal shields control heat loss. Insulation protects the power feed and the thermocouples.

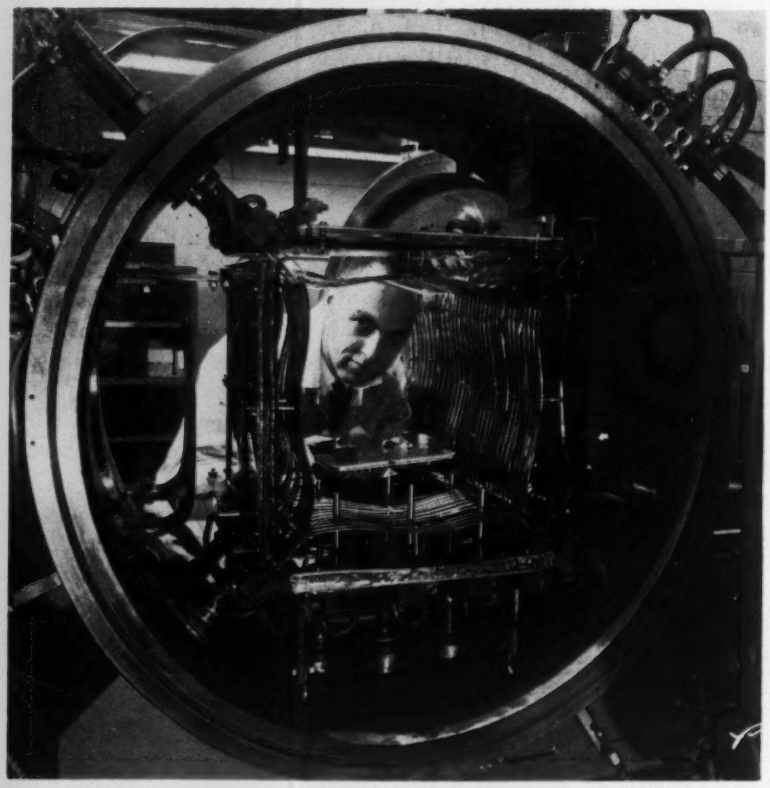
Small mass and low specific heat of all internal parts allow fast heating and cooling. Inert gas can be used to speed the cooling rate. It may also be used to step up the heating cycle.

Good Size—The heater on the furnace has an interior that measures 12 x 12 x 12 in. Built for The Martin Co. by the National Research Equipment Corp., New Highlands, Mass., the cold-wall furnace meets use at 4000°F for periods of one hour. For shorter periods, a temperature of 4500°F can be maintained.

A saturable core reactor provides the power control. Thermocouples help to maintain the temperature.

An outstanding feature of the furnace is that the chamber opens on either side of the shell. This eases placement of the work charge. It also speeds maintenance of the elements and shields.

The horizontal stainless steel inner chamber has a stainless steel water-jacket. The chamber is about 34 in. long and it has a dished-type head. Hinges on the head allow an operator to swing it open for loading. A rear dished-type head is also hinged. It suits servicing at the back of the furnace.



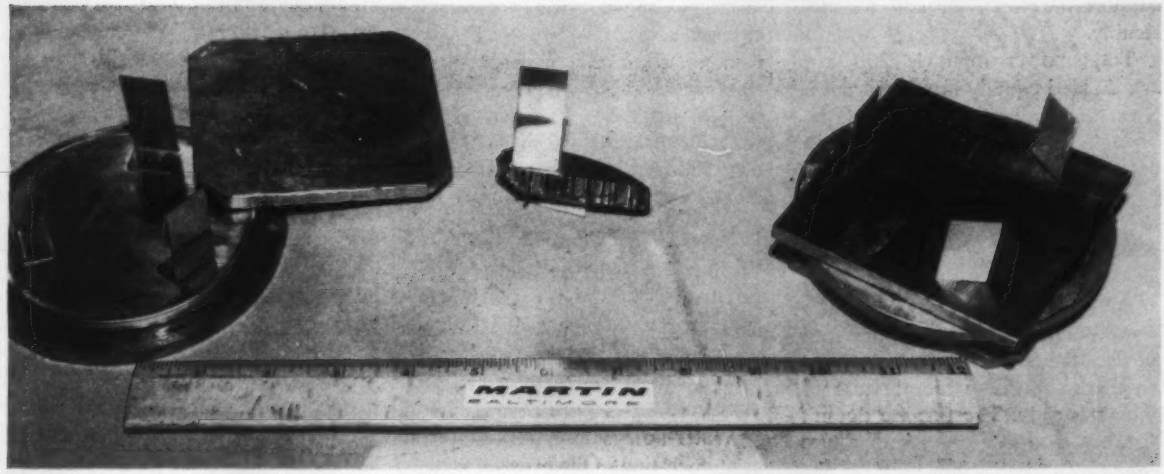
OPEN ENDS: Hinged heads at the front and rear of the furnace provide access to the working area. They also suit servicing. Tungsten pins protrude from the base. These pins support the work piece.

Cold Walls—Very important in any high-temperature, vacuum cold-wall furnace is the design of the resistance heating element. Standard designs usually consist of rod, wire or ribbon elements. Most of these require refractory insulation that is exposed to the radiant heat.

This insulation isolates the heating elements from each other and from ground. But the refractory insulation causes serious problems. And it can't withstand heats up to 4000°F.

Tantalum serves as the heating elements in the new furnace. All six sides of the working area contain tantalum strips. Corrugations on the strips increase their strength. Shielded, water-cooled copper posts support all strips.

The tantalum heating elements



RADIATION SHIELD: A brazing temperature of 3300°F, with 10 minutes hold-time, is used to treat a metal radiation shield. Atmosphere remains at 1 x 10^{-4} mm. Braze filler is 0.0027-in. pure titanium.

operate on low voltage. There's little chance of arcing between elements and other furnace parts. Thermal expansion problems are eased by the serpentine shape of the heating elements.

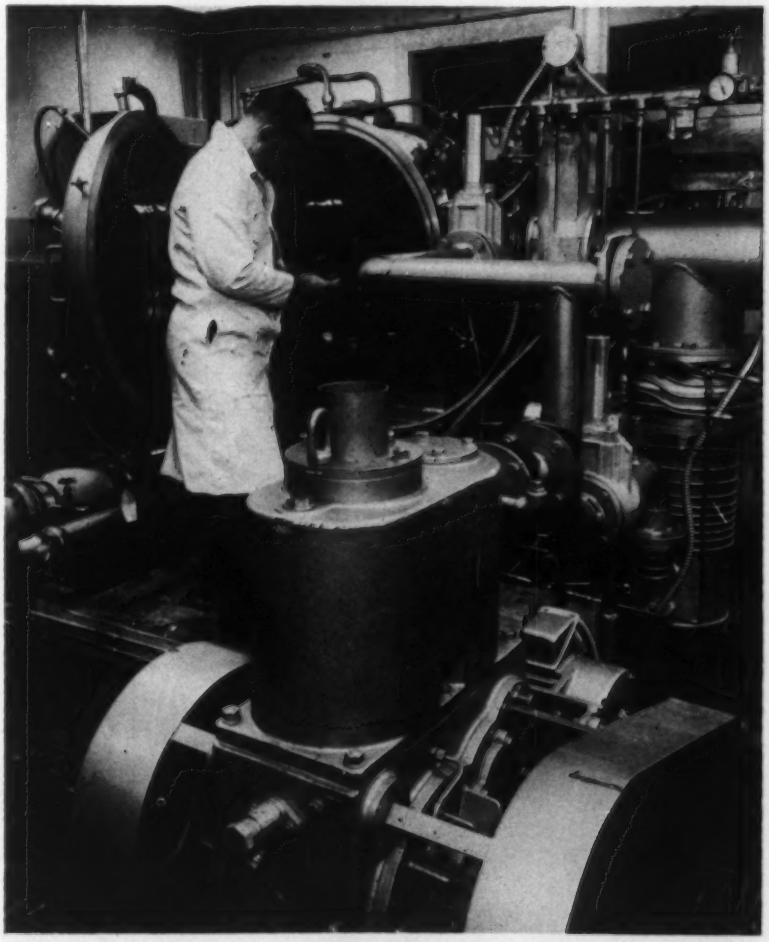
Little Heat Loss — Radiation losses from this type of element are less than with rod or ribbons. Reason: Reflected heat from the work-charge passes between the ribbon or rod element to the heat shields.

Closely-spaced corrugated and serpentine-shaped heating elements hold radiation and conduction losses to a minimum. And distortion becomes almost nil with this new element design.

All the radiation shields are arranged in packs. Each assembly consists of three tantalum and three molybdenum shields. These assemblies mount on the walls of the tank.

Power comes to the heating element tabs by means of water-cooled copper bus bars. Heating elements are bolted to these bars. A larger water-cooled copper bus bar supports the heating elements. It also prevents excess distortion and growth.

Tungsten Supports — Tungsten rods on 4-in. centers extend through the bottom heat shields. These rods



BIRD'S EYE VIEW: Operator prepares to insert part into vacuum furnace. Inner chamber is about 34-in. long. A stainless steel water-jacket completely encircles the large diameter chamber.

support the work jig and the assembly.

Total power input is 200 kw. It's divided equally on all six sides. Saturable core reactors control the voltage to the heating elements in each zone.

Control signals for the reactors are received from a magnetic-amplifier system. A strip-chart recorder keeps a record of the signals.

An operator sets the manual-power-control knob to any desired power input. This causes the corresponding furnace temperature to remain steady. The furnace doesn't overheat because the temperature limit is a direct function of the power input.

This condition is maintained even though several changes and variations may occur. These include changes in element resistance; changes in element emissivity; variations in shield efficiency; shifts in heat-input requirements of the work load, build ups in sight-glass obstructions; and shifts in thermocouple output.

Fail-Safe Control — When heat-up needs of the load increase or efficiency of the radiation shields decrease the element's temperature decreases under constant power input. This action provides fall-safe control of the input power.

Water-flow safety switches prevent operation in the event of water-supply failures.

Problems of measuring and recording reliable temperature readings at 4000-4500°F are tough. Research at The Martin Co. has been conducted with optical-pyrometer methods as well as with thermocouples.

Tungsten-molybdenum and tungsten - iridium thermocouples are limited. The tungsten-molybdenum combination has low thermal emf. It becomes brittle upon heat cycling. Iridium is also brittle to some extent and it's very scarce.

Condensation Problem — Condensation poses the main drawback to optical methods. It's hard to prevent condensation from forming on the sight glass.

A long water-cooled viewing tube can be used. But over a period of time, condensate—caused by gas evolution from the charge—darkens the glass.

The Martin Co. uses a tungsten-rhenium thermocouple. Why? Because it has many advantages over sight glasses and other thermocouples.

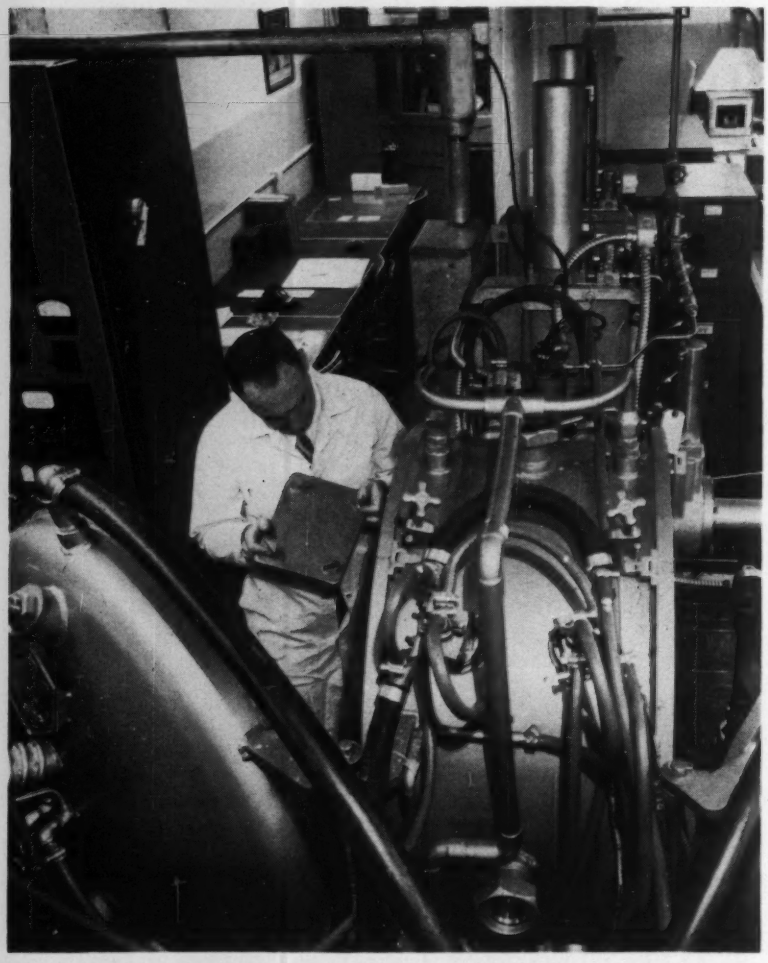
Advantages include: high thermoelectric potential, high thermoelectric power, a very high melting point, chemical stability in neutral or reducing atmospheres and good ductility after heat cycling.

Electrical Power—To date, no more than 135 kw has been needed to operate the furnace and its accessories.

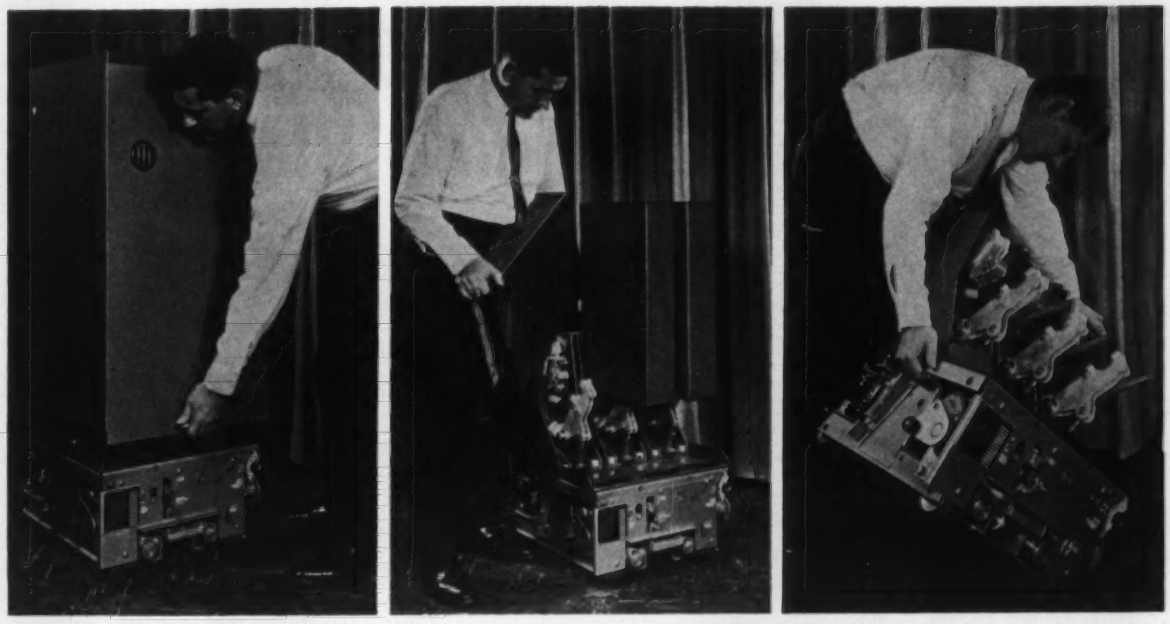
A minimum pressure of 40 psi and a water temperature of 60° to 85°F are used. This produces a flow of about 100 gpm when the furnace operates at 4200°F.

Since the heating elements are made in sections, only defective portions need to be replaced. Should an entire set of heating elements wear out, they can be replaced in 16 manhr.

Processes under investigation include: determination of interstitial element (O_2, N_2, H_2) in refractory metals and their alloys; vacuum annealing of fusion-welded joints of refractory metals and their alloys; and the sintering of various exotic metals and their alloys.



DUAL EVACUATION: Two pumps produce quick evacuation. One pump is mechanical. The other pump, behind the furnace, is a diffusion type.



ONE-MAN JOB: Compact 4160-v unit offers easy handling. One man removes interphase barrier from base of breaker (left), lifts arc chute from pivot point (center) and inspects all devices (right).

Circuit Breakers Get New Look

New Design Concept Meets Industrial Demands

Designers and engineers have put their heads together to create switchgear equipment that will reflect a savings to the user.

The new units are light, compact and easy to install and maintain.

▪ A new lightweight, 4160-v circuit breaker and switchgear offer many new features. The upkeep is almost nil and its compact design limits labor hours spent on adjustments. To the maintenance-minded man, here is something to think about.

Set It—Forget It—The breakers combine stored-energy closing and ironless blowout to produce the smallest comparable unit in the 4160-v field. The unit is a major advance toward industrial needs in terms of fault production, safety, easier handling, installation, maintenance and service.

The 4160-v circuit breakers and switchgear are used by industrial plants for control and protection of motors, generators, distribution circuits, transformers and other electric equipment.

Ironless Blowout — Face-wound blowout coils are a radical advance to the circuit breaker art. The I-T-E Circuit Breaker Co. perfected this technique to do away with the magnetic iron formerly used in interrupters. The change from iron provides faster interruption; this results in far less deterioration of the entire system.

The lightweight coils produce a high flux density which pulls the arc into the chutes faster to reduce erosion. Quick arc action also cuts interruption time and increases contact life.

Low Maintenance — The unit uses breaker contacts that are virtually maintenance-free. Heat-resistant silver alloys reduce contact deterioration normally caused by arcing.

Arc chutes tilt back by hand for easy inspection of contacts and chute interiors. The chutes can be removed easily without tools and can be carried by one man.

The lightweight switchgear compartments were designed to provide easy access to buses, breakers, control wiring and auxiliary equipment.

Lower Costs—Control power requirements have been cut drastically. This system uses about one-tenth of the current required on former units of this type.

High-Temperature Strain Gages Check Out Jet-Engine Blades

By J. N. Canfield—Westinghouse Electric Corp., Aviation Gas Turbine Div., Low Power Lab., Kansas City

Turbine blades on a jet engine have to withstand 1700°F at speeds above 10,000 rpm.

Ultra-thin, metal-foil strain gages provide the key to safe jet-aircraft flights.

■ Reliability and safety must be bywords of the aircraft industry. Safe flight hinges on data from complex test setups — in extreme environmental conditions.

These tests establish criteria for dependable service. Evaluation of a jet engine's turbine blades is an example of advanced test methods.

Fast and Hot — A jet turbine extracts power from hot gases and drives a compressor and accessories. Operating above 1700°F and at speeds in excess of 10,000 rpm, reliable turbine blades are a result of careful design and material selection.

One force that contributes to blade failures is vibratory in nature. This force doesn't depend upon the amount of power being absorbed. Quite often the cyclic effort of the blades — passing stationary nozzle vanes—causes the exciting force. In some cases, "hot spots" in the gas stream produce excitation.

Early in a turbine-development program, tests detect the endurance strength of a selected blade material and a fixed design. The next step centers on tests of the blade in actual use—both in the test cell and in flight.

Metal-Foil Gage—High-temperature strain gages provide the primary tool for all tests. The most commonly used strain gage is the metal-foil type. It consists of a thin special-alloy grid with tabs for making electrical connections.

A ceramic cement having good dielectric properties secures the film-like grid to the blade. As the grid elongates or compresses—due to movement of the blade surface under load — the gage's electrical resistance changes. The resulting change in current flow correlates directly to the working strain in the blade.

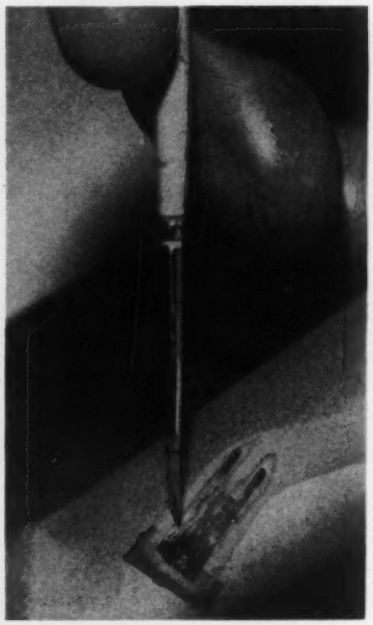
Use of strain gages on jet turbine blades presents a number of problems. The high operating temperatures and rotational speeds of the blades require good gage alloys and dependable ceramic-cement materials. Gage installation must be ultra thin so that the aerodynamic function of the blade isn't distributed.

Loose Fit—In most turbine designs, the blade to disc fit-up is loose. This allows for expansion and vibration damping.

Lead wires that run from the gage across the disc to the engine axis must not interfere with the blade fit-up. As in any rotating strain-gage installation, the connections between the gage and the external instrumentation are made through a slip-ring commutator.

The commutator must be located on the engine centerline. At speeds above 10,000 rpm, the problem of commutator design becomes difficult.

Before the actual gage installa-



DELICATE STROKE: Coating of ceramic cement insulates the grid.

PLATINUM LEADS: Spot welds secure platinum ribbons to gage.

tions begin, modification of a number of engine parts must take place. Except in twin-spool or turbo-prop engines, the commutator is mounted at the intake or "cold end" of the engine. Hot-end installations are avoided if possible because of the additional problems of cooling the commutator.

Since a clear passage to the cold end from the turbine is not provided by the engine designer, provisions for such a conduit have to be made.

Provide Seals—Seals are needed to prevent the escape of hot turbine gases to the cold-end area. Radial holes must be drilled through the turbine's shaft-mounting flanges. These holes route the lead wires to the engine centerline.

Instrumented areas on the blades are carefully cleaned prior to application of the ceramic cements. These cements will not adhere if any oil or oxide residue exists.

A technician applies a coat of cement to the blade by spray or brush before he applies the gage. This "pre-coat" insulates the gage grid from the metal. After the strain gage is positioned, the technician covers the gage with a top-coat of cement.

Due to the delicate structure of the gage, installation usually takes place under a microscope.

Furnace Cure—High-temperature strain-gage cements must be cured to produce their maximum strength. Furnace heat depends upon the type of gage used.

Spot welds attach the lead wires to the gage. Because the gage material is extremely thin, the leads are in the form of ribbons. A common size is 0.003-in. thick by 1/64-in. wide.

Platinum alloy leads are often used. They weld easily and have good strength at high heats. Since the lead ribbons are uninsulated, they're attached to—and insulated from — the blade's surface with cement.

After the technician routes the leads from the blade to the turbine discs, he fastens them to larger, insulated lead-wires. These heavier leads complete the electrical circuit through the engine to the commutator.

LITTLE MASS: Technician fastens a high-temperature strain gage to the airfoil of a turbine blade. Gage is less than 0.0005-in. thick.

Final Results — The number of strain gages used during a single test depends upon the capacity of the slip-ring commutator.

Oscillograph film or magnetic tape records the strain gage signals coming through the commutator. Reduction and analysis follow.

In flight tests, other parameters of the engine and airplane are recorded simultaneously with the gage signals. These tests provide complete evaluation data.

After all test results have been analyzed and compared with the operating limits of the blade material, a reliability limit can be defined. If test results fall below expectations, corrective measures are sought. Once a fix is made, the evaluation procedure must be repeated to verify and approve the change.

Grinders Use In-Cycle Gaging To Make Precise Bearings

Centerless grinders in a new bearing plant make use of automatic gaging to meet tolerances as close as 0.000028 in.

A total of 758 gaging operations go into the production of one spherical roller bearing.

▪ Ball and roller bearings are among the metalworking industry's most precisely made products. But just how far can a bearing maker go tolerance-wise in the mass production of a precision product?

The answer can be found at the Link-Belt Co.'s new bearing plant in Indianapolis. At this new plant, precision is the keynote of all work stages. As many as 758 individual gaging operations help to check out a single spherical roller bearing. Tolerances as close as 0.000028 in. are maintained.

Centerless grinding, with automatic in-cycle gaging, prevents overgrinding of all parts.

Production Flow—The 454,000 sq ft plant incorporates separate (non-interfering) flow patterns for the basic parts that make up each bearing. Work flow can be summarized as follows:

Steel moves from the raw tube or bar through initial machining stages. It next undergoes heat treatment and precision grinding. Inspected material transfers to finished-part storage.

As needed, the parts are subassembled into unmounted ball and roller bearings. Unmounted bearings enter first-in, first-out storage. Here they await final assembly.

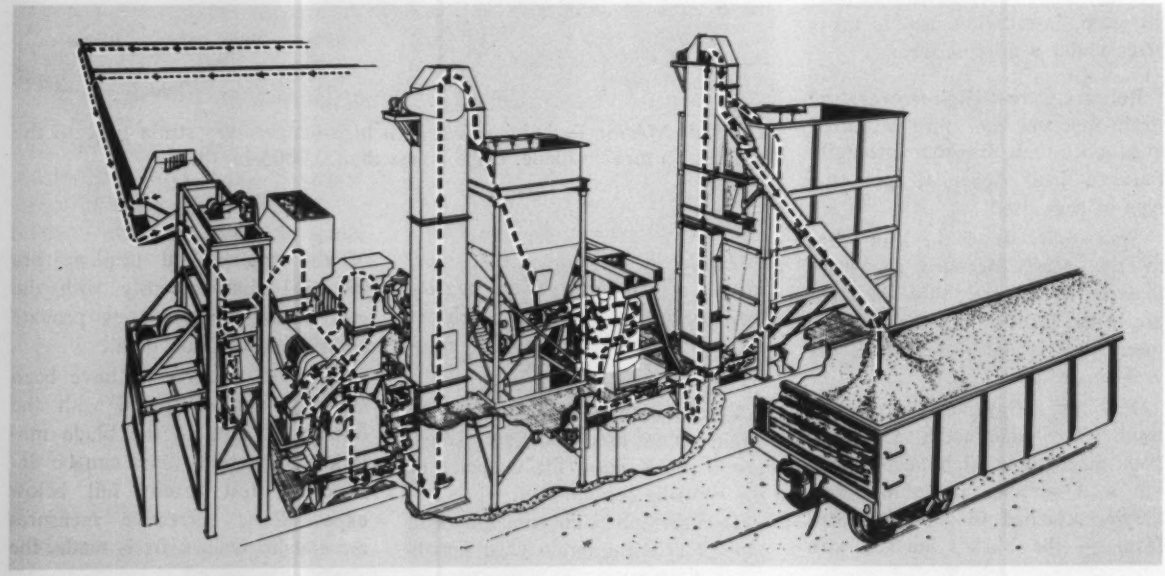
Cast housings enter the other end of the plant. After they're machined and painted, they progress through inspection. Then, the housings enter storage where they await assembly. Completed assemblies form shippable units.

Materials Handling—Wide use of L-B Co.'s own materials handling equipment adds to the overall efficiency of the plant. Fast handling speeds raw materials, components in process and inspection, and subassemblies—in and out of storage—to assembly and shipping areas.

An overhead crane unloads steel stock from rail cars and stacks it in tiered racks. The racks are lifted and transferred by a switching arrangement to an adjacent bay 180-ft long by 80-ft wide. This bay houses a battery of multiple-spindle automatic screw machines.

Seven overhead conveyors, an in-the-floor device which tows indus-

System Recovers 95 pct of Cutting Oil



PREMIUM DRY SCRAP: In-the-floor drag conveyors discharge chips into a surge hopper. The hopper feeds the chips to a crusher. After they're crushed, an extractor spins the chips and removes the oil.

trial trucks, and a series of powered and gravity roller conveyors keep parts moving through all work stages.

Precision is assured with sealed-off air conditioning and dehumified areas for inspection, sub-assembly and storage. In the inspection area, temperature remains at a constant 78°F. Humidity stays at 35 pct.

These factors help to prevent corrosion during processing. They also establish controlled temperature-humidity conditions. Under such conditions, all parts—together with the gaging equipment—maintain a common dimensional relationship.

Precision Grinding—Ultra-precision centerless grinders, equipped with automatic loading, finish bearing parts to close tolerances. The grinding machines use their own in-cycle gages. In addition, checks are constantly made on the finished parts by an array of other test gages.

Step-by-step, as parts progress through the various work stages, gaging takes place. All parts are again inspected, gaged and classified by dimensions at the final check-out area.

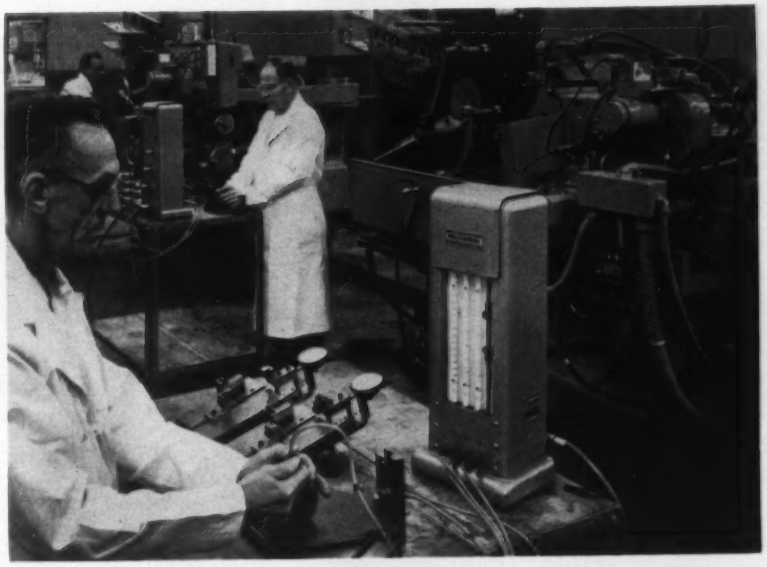
Sixty-nine different gages grade the parts of a single bearing. These gages constitute a portion of the 758 gaging operations which occur.

Chip Handling—One of the cost-reducing facilities at the new plant is an L-B chip handling and cutting oil recovery system. This system recovers more than 95 pct of all cutting oil. It also gives a high premium on crushed chips. And it reduces railroad-car storage 75 pct.

The system precludes the manual handling of oily metal turnings from the automatic screw machines. In-the-floor drag conveyors discharge all chips into the system where they're crushed to uniform size.

Cutting oil is extracted and purified for safe re-use. This oil returns to the central cutting-oil supply.

Personalized Power—The bearing factory has its own power plant. Two coal-fired boilers provide process steam at 100 psi. They also produce steam for heating at 30 psi.



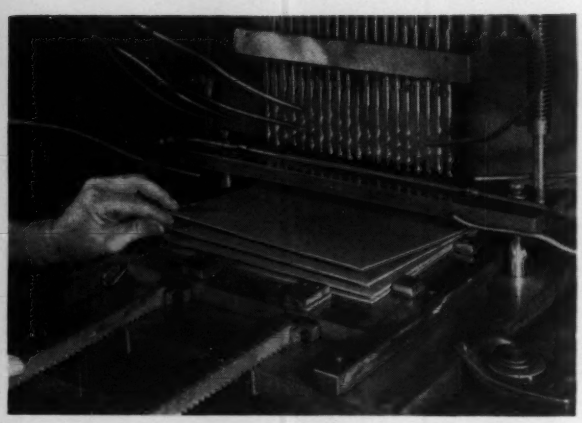
RADIUS CHECK: A technician checks out the radius of a bearing's raceway. Electronic controls help grinders to control tolerances.

ELEVATED TRUCK: A mobile elevating truck conveys bin-coded baskets to and from storage. Operator deposits baskets on inclined racks.

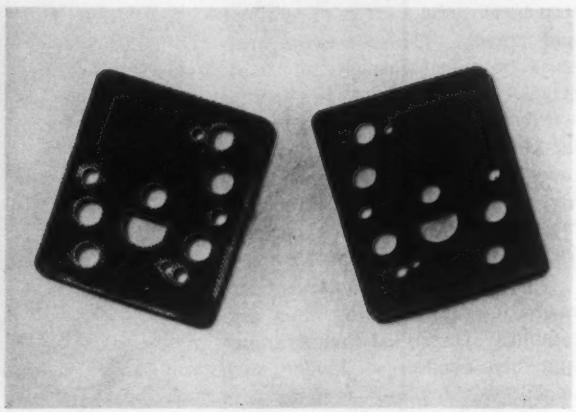
Electric power for the entire plant comes from a local utility. Nearby sub-stations provide 13,800 v. Transformers at the plant step down the current to 440 v.

Some of the machine tools require various electrical frequencies. Alternators in the plant give current ratings of 150, 240, 420, 660 and 1660 cycles per second.

The plant even has its own waste and sewage treatment system. Waste water collects in sumps and is neutralized. Then, it's admitted to the sewage system which treats the domestic sewage and chlorinates the effluent before discharge. Designed and built by L-B, the sewage system has a capacity of 160,000 gpd.



STACKING HELPS: By ganging thin pieces, the sandwiching effect adds support to inner layers.



CLEAN HOLES: Plastic laminate on right looks clean, when three-step approach is used.

Good Tooling Ends Laminate Halo

Haloing effects mar the look and often crop the use of drilled or punched plastic laminates.

Correct this problem by adding firm support to the workpiece.

■ Haloing or corona effects can be a troublesome problem when drilling or punching laminated plastics, particularly with brittle grades. A simple three step approach can end these surface eyesores which are not in most cases damaging to the part but visually undesirable.

Mr. H. L. Hildebrand of Taylor Fibre Co., boils it down to this—simply give the material firm support around the edges of the punched or drilled holes.

One-Two-Three Approach—When haloing occurs due to drilling, hold the work in a self-clamping, compression type jig. This puts the work under pressure. The base of the jig serves as a backup to prevent rupture of material edges where the drill breaks through or withdraws.

In punching, a pressure-pad type die will accomplish the same end. Step two becomes necessary when the holes at the base of the drill jig begin to wear. As this occurs, there is less support immediately under the edges of the holes. When the drill breaks through the laminate, a halo is formed around the hole.

A simple way to support the work is to insert a piece of inexpensive phenolic laminate under the work. This gives fresh support around the stress points. Any scrap laminate can be used. However, a thickness of 1/16 in. is usually adequate.

Last Step—To eliminate haloing on metal-clad laminates and softer materials, simply stack the work to be drilled or punched. This self-sandwiching effect not only speeds production, but automatically limits haloing stress to the top and bottom pieces.

If haloing should occur on the top and bottom, adoption of step one or two will resolve the problem.

Many Uses — Copper-clad laminates are widely used today in printed circuitry. Here, the haloing problem is generally referred to as lifting or belling. This type of defect is highly objectionable since it can affect performance of the printed circuit. With today's space age demands, aluminum, magnesium, steel and even gold and silver are used as cladding materials for special purposes.

Feed and Speed — Proper tools must also be considered due to the difference in physical properties between metals and laminates. A Bakelite-type drill with a 60° point angle is recommended for most drilling of plastic laminates. To reduce pull or grabbing, use a 0° lip-rake on the drill, with the error leading to the negative side. High-speed drills are quite satisfactory for most applications, though carbides are suggested for glass-base materials.

Speeds up to 400 sfpm are permissible. Feeds as a rule, should be made by hand. This will permit the operator to decide by feel whether the drills should be withdrawn to clean the flutes.

Sharp drills and highly polished flutes will definitely raise your production output.

A final note to remember is that laminates shrink after the drill is removed. It is necessary to drill 0.002 to 0.004 in. oversize, or ream the hole to the size required. This effect is less noticeable when drilling glass base materials.

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This service already has proved itself to satisfied customers who are the very life blood of Acme-Newport. Use *Red Circle Service* to balance *your* inventories with early deliveries of flat rolled steel made to your exact specifications.

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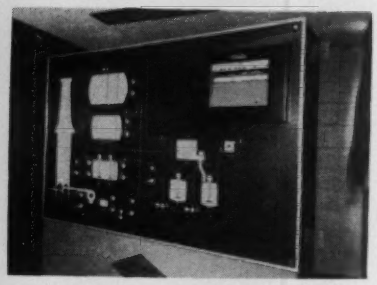
Cold Rolled Sheets
Alloy Sheets and Plates
Plates (3/16" *and lighter*)
Electrical Sheets
Electric Weld Line Pipe
Spiral Welded Pipe

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF [ACME STEEL] COMPANY

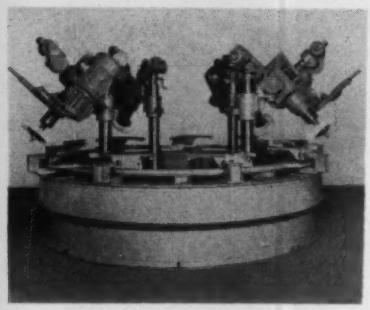
New Equipment and Machinery



Annunciators Monitor Systems of All Kinds

Produced in a variety of sizes, a line of annunciators meets a wide range of architectural requirements and system specifications. Opaque plastic fabricates the panel face, with its functional system silhouettes. The annunciators are available with or without integral recording apparatus. A glance at the monitoring unit reveals what combination of several operations is being performed at any given moment; also, the stage of development of each operation. (Prenco Mfg. Corp.)

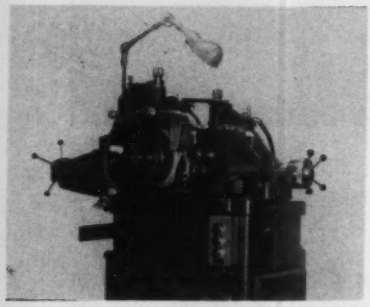
For more data circle No. 1 on postcard, p. 85



Finishing Machine Cuts Floor-Space Requirements

Featuring a rotary-conveyor design, an automatic polishing and buffing machine finishes high-production parts. Parts having sweep or angular shapes are ideally adopted to finishing on the machine. The parts load and unload from one position on the circumference of the machine. The 12-ft diam machine consists of a rotating outer conveyor ring and a stationary inner ring. Work pieces mount on fixtures on top of an 8-in. wide table on the rotating ring, and move past buffing wheels mounted on adjustable lathes. (Acme Mfg. Co.)

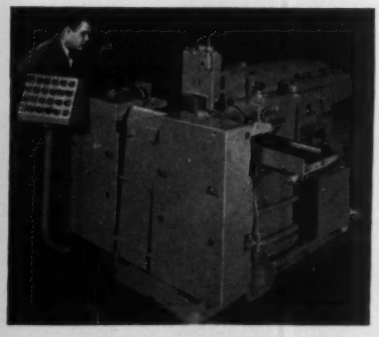
For more data circle No. 2 on postcard, p. 85



Grinder Grinds Variety of Materials

Designed for through feed, plunge feed and infeed, a centerless grinder with crush dresser grinds multiple diameter parts and intricately-shaped profiles. It can grind such materials as Tungsten Carbide, stainless or carbon steel, glass or plastic. It also grinds wood, nonferrous metals, fiber, hard rubber, ceramics and cork. Its special characteristics are: high output and fast checking with both sides of the wheel accessible from operating position; wheel dressers can be either manually or hydraulically operated. The unit measures 24 x 48 in. (Royal Master Grinders, Inc.)

For more data circle No. 3 on postcard, p. 85

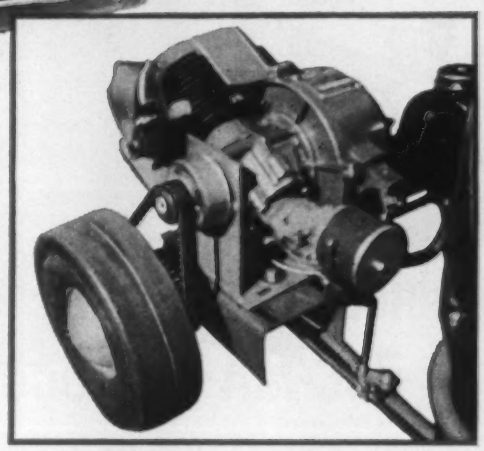


Hydraulic Shaper Features Full Automation

Fitting into conveyor-line production, an automated hydraulic shaper opens up a new concept for producing formed or shaped parts of flat metal plate or bar dimensions. The machine is equipped with tool holders and tool gages for presetting tools. The trailing edge of one plate and the leading edge of the following plate are machined in the cutting sequence. Positioning of the work is flexible up to the rated stroke of the air cylinders used, and work of different widths can be accommodated. The transfer table is interlocked with the shaper so that the cycle is interrupted if positioning or indexing fail to function. (Rockford Machine Tool Co.)

For more data circle No. 4 on postcard, p. 85

US RUBBER **PowerGrip** "TIMING" BELTS from the Power Unlimited complete belt line



Even the youngsters are making time with the U.S. PowerGrip "Timing" Belt

Howard Industries, Inc. (Sumter, S. C.) use the U. S. PowerGrip "Timing"® Belt to get perfect transmission response on the Go-Karts they manufacture.

Says Howard E. Short, president, "This car is being raced with gratifying results by children and adults. The U. S. PowerGrip 'Timing' Belt provides positive transmission of power. Our engine is a 2½ h.p., 2-cycle chain saw engine turning up at 6200 r.p.m.

"U. S. PowerGrip 'Timing' Belt drives made it possible to economically convert this motor for installation in the Go-Kart. Since 'Timing' Belts are fixed drives, they need no maintenance or adjustment and they whiz the Go-Kart along at speeds of 35 to 60 miles per hour, depending on the drive ratio."

U. S. PowerGrip "Timing" Belts with speeds ranging to 16,000 r.p.m. and up to 1000 h.p. have made possible not only the efficiency of the Go-Kart, but literally the design and production of hundreds of appliances and equipment, ranging from sensitive electronic devices, office machinery, household equipment and gigantic production machinery.

One way to get expert transmission counsel is from the U. S. Rubber Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

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LITTLE LATHE **Large Savings**

Lodge & Shipley Hi-Turn 45° COPYMATIC Lathe

"$10,000 Saved Is $10,000 Earned!"

A too-big, too-expensive lathe doesn't mean you'll do the job quicker, better or at lower cost. The Lodge & Shipley 1307 (10") HI-TURN 45° COPYMATIC Tracer Lathe is priced lower, by as much as $10,000, than conventional lathes of equal or less capacity . . . and that's just the start of savings!

Building the HI-TURN exactly to production requirements, Lodge & Shipley eliminates the leadscrew and all its complicated gearing. The result is a rugged lathe at exceptionally low cost with high accuracy and productive capacity.

If you perform manufacturing or tracer lathe operations, it will pay you to investigate the many features of the low-cost HI-TURN Lathe.

- 5 HP at all speeds—9 geared speeds up to 3000 RPM
- Designed for heavy feeds
- Special spindle bearings require no warm-up period
- Famous elliptical girth bed
- Super rigid base—requires no special foundation
- Flame hardened and ground replaceable steel bedways
- Hardened and ground cross slide ways
- Allows machining, with a continuous cut, of almost any combination of normal lathe operations

This "little lathe" has proved itself as a "big producer"—gives you productive capacity matched to the job. Available in Production or 45° Tracer models. Write for information: Dept. HL-106, The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.

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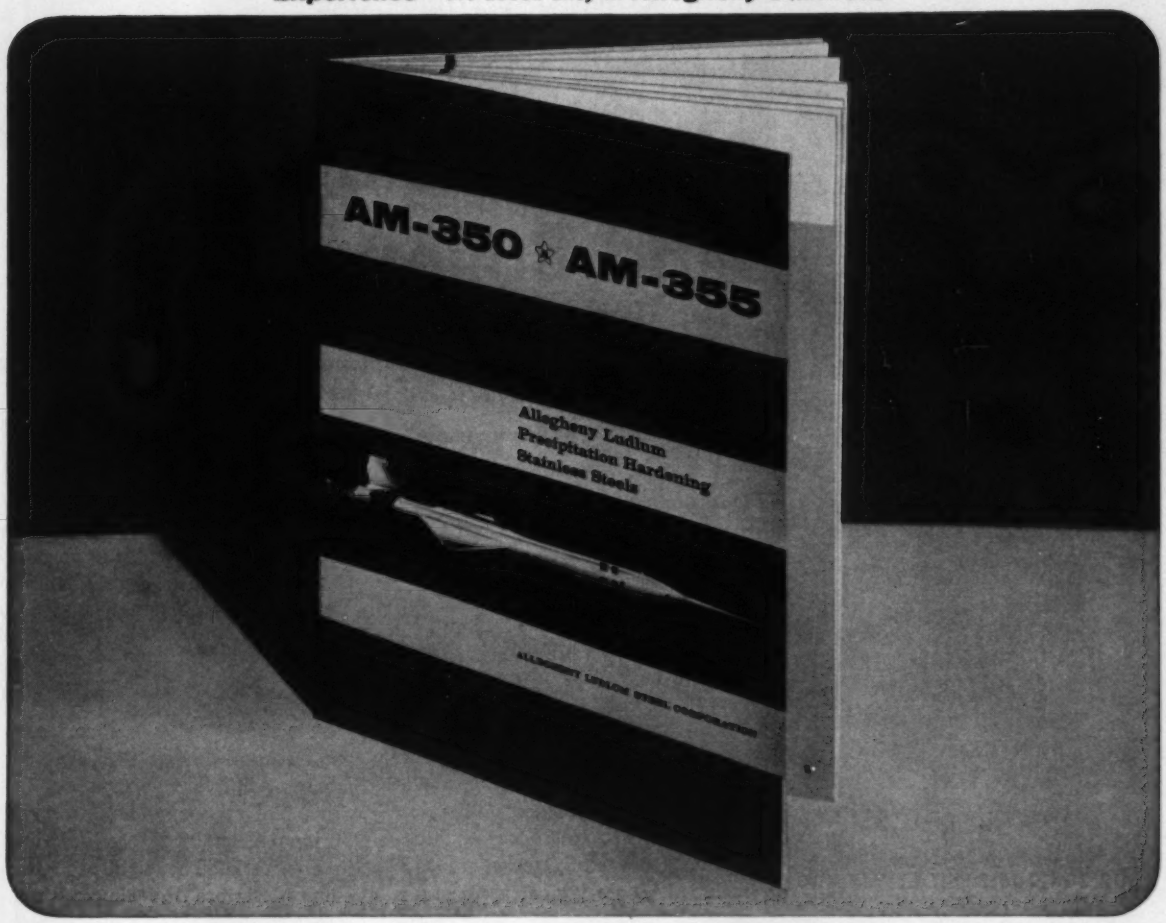
***Experience**—the added alloy in* **Allegheny Stainless**



New booklet on A-L's precipitation-hardening stainless steels, AM-350 and AM-355

A tool for anyone interested in high strength-to-weight metals

In this technical booklet, you get the facts on Allegheny Ludlum's precipitation hardening stainless steels, AM-350 and AM-355, metals developed for space age requirements.

AM-350 and AM-355 combine these unusual qualities. They are easy to fabricate. Have high strength-to-weight ratios at room and elevated temperatures combined with excellent resistance to corrosion.

The physical and mechanical properties of the two metals are described in 33 charts and tables. Included are heat-treatment and fabrication data, eight photomicrographs and a section on corrosion resistance with representative values in selected environments.

It's jam-packed with data. For your free copy, see your A-L representative or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. IA-6-1.*

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 85.

Extruded Rectangles

Described in a bulletin is extruded, special aluminum bronze rectangles for severe wear and abrasion applications. The illustrated four-page bulletin contains sizes, weights and typical physical properties, as well as specifications to which the rectangles conform. Maximum size tolerances and deviation from straightness are also included. Some typical applications of the rectangles are: wear strips and plates, gibs, ways and slides. (Ampco Metal, Inc.)

For free copy circle No. 5 on postcard, p. 85

Drilling Machines

Information on drilling machines is contained in a four-page folder. A feature of each machine is tape control for numerically-controlled production. Each machine is described in general with overall dimensional data. (Lahr Machine & Tool Corp.)

For free copy circle No. 6 on postcard, p. 85

Rubber Hose

The subject matter of a 24-page catalog is a complete line of rubber hose, for general industrial applications. The two-color catalog contains complete descriptions on over 35 specific types of hose, used throughout the manufacturing and processing industries, utilities, municipalities and in commerce generally. In addition, the catalog supplies pertinent data as to size, weight, and ply working pressure, in chart form. Illustrated are 17 different types of fittings and couplings. (For free copy write on company letterhead to Mercer Rubber Co., Hamilton Square, N. J.)

Ladle Feeders

Advantages of automatic, ladle-additions feeders, that provide greater additive recovery and improved ingot quality at lower cost during steelmaking, are described in a bulletin. The eight-page brochure describes the simple three-step process of loading, positioning, and controlled feeding employed with the units. In addition, it details types and mountings—tailored for plant operating conditions; and reviews vibrating and weighing controls designed for uniformity and increased production. (Blaw-Knox Co.)

For free copy circle No. 7 on postcard, p. 85

Protective Coating

A bulletin on a heavy-duty, rapid-drying coating explains methods of surface preparation. It also covers removal techniques and recommended spray equipment. The coating is used for general indoor and outdoor heavy-duty protection in domestic and export shipment; for storage of finished and semi-finished metal parts, metal stock, and metal equipment. (Dearborn Chemical Co.)

For free copy circle No. 8 on postcard, p. 85

the ROTOLOK©
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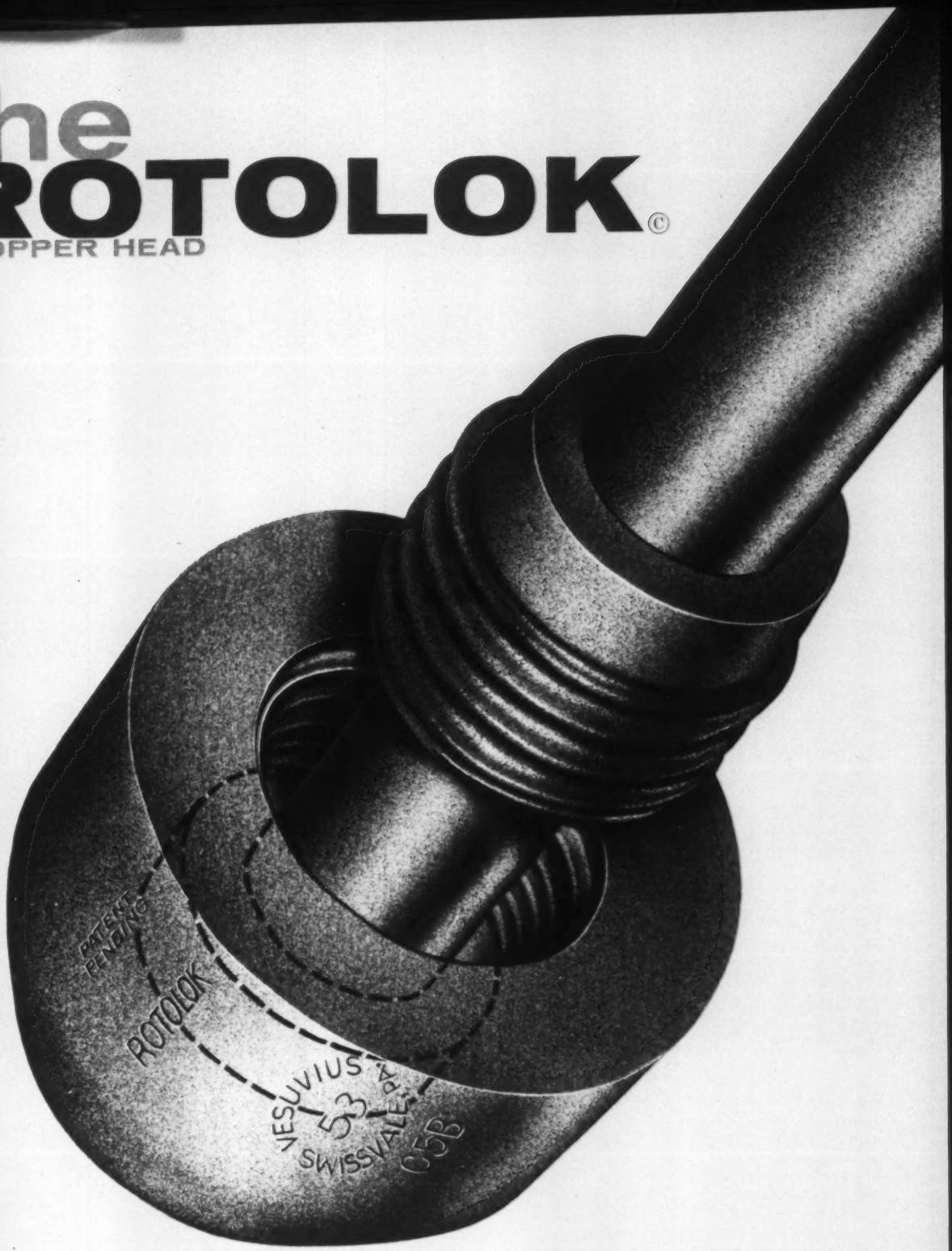

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for the metal pouring industry

SWISSVALE **PITTSBURGH 18, PA.**

Want a Press to Triple Your Forging Output?

We'll build the press for all your forging requirements . . .

Tell us your forging problems and give us your production specifications—we'll do the rest.

Erie Foundry, one of the first companies to automate forging, can provide specially designed *high volume* presses in capacities of 1000 to 8000 tons. Instead of the three machines and nine men formerly required, now you need only one Erie automated forging press and only one operator observer—to triple your present production rate! Trimming, too, can be accomplished in a single production cycle. With billet supply and finished part removal conveyorized, it is possible to achieve a production volume of, say, 1200 track-link forgings per hour.

Erie Foundry has a complete line of machines designed for high volume production of such parts as connecting rods, gear blanks, automotive and tractor valves, pinions, track links and wheel hubs.

We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 1, Pa.

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Equipment Fabrication

Company qualifications, for the fabricating and machining of large, unusual or difficult pieces of machinery and equipment, are outlined in a new four-page bulletin. It cites outstanding fabricating jobs completed by the company, including the carriage for a 280-mm atomic cannon, and large sinter plant components. Facilities in the machine shop, structural shop and research laboratory also are described. (Dravo Corp.)

For more data circle No. 21 on postcard

Heavy-Duty Fans

Describing a new line of 6-, 7-, and 8-ft diameter fans, a four-page bulletin gives complete dimensional information. In addition, specifications, application details, and ordering information are also given. (Monarch Electric Co.)

For more data circle No. 22 on postcard

Furnaces

Full muffle, hydrogen - atmosphere hand-pusher furnaces are described and illustrated in a brief bulletin. The furnaces are used for bright hardening and annealing of stainless steels, and other high-alloy materials. The bulletin also contains a furnace cut-away drawing with dimensions, and a chart of furnace specifications for both the electric and gas types. (Lindberg Engineering Co.)

For more data circle No. 23 on postcard

Nylon Parts

Molded nylon parts, available from stock molds, are illustrated in a six-page catalog. Among the assortment are numerous bushings, washers, rollers, gears, bearings, and glides. Many of the parts can be supplied in Delrin as well as nylon. (Nylomatic Corp.)

For more data circle No. 24 on postcard

Gas-Turbine Power

An eight-page bulletin introduces a family of 75- to 20,000-hp ultralightweight, compact gas turbines. They can be used for a wide variety of applications including fluid and gas pumping, electric-power generation, and marine and vehicular propulsion. Described are design features, performance and operating characteristics, plus current and potential applications for the 900- and 20,000-hp model gas turbines. (General Electric Co.)

For more data circle No. 25 on postcard

Polishing Chrome Plate

A data sheet covers various abrasive-finishing methods used to produce bright satin or butler finishes on heavy chrome plate. Material includes recommended compounds, type of buff and buff speeds. (The Lea Mfg. Co.)

For more data circle No. 26 on postcard

Power Presses

Straight - sided, double - crank, mechanical power presses are detailed in an eight-page catalog. The presses feature welded-steel construction and a new streamlined design. In addition, the catalog contains a chart listing the standard and extra features available on these presses. (The Cleveland Punch & Shear Works Co.)

For more data circle No. 27 on postcard

Glass-Bag Filters

Ways to lick one of the toughest air-pollution problems in industry are presented in a 12-page bulletin. It presents illustrated application data, which describes how the glass-bag filters provide virtually 100-pct efficiency in cleaning hot, corrosive gases in three plants. These plants are representative of the metallurgical and cement industries. The maximum temperature capacity of the filters is 600°F. Another section of

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FREE LITERATURE

the bulletin deals with methods of cleaning glass fabric bags. (Dracco Div. of Fuller Co.)

For more data circle No. 28 on postcard

Helicon Gears

Introducing a new gearing system, an eight-page pamphlet contains a complete description of the gears and the system's relation to other types of face-gearing. Manufacturing processes and design details are also included. The booklet is generously illustrated with photographs and line drawings. The gears are applicable through a ratio range from 3:1 to 400:1. (Illinois Tool Works)

For more data circle No. 29 on postcard

Dial-Feed Welders

A 12-page brochure describes a dial-feed mechanism for dial-feed resistance welders. Included are drawings and photographs of the index mechanism, and a graph showing recommended rate of indexing for various number of stations. Twenty-eight machine photographs and case histories outline: product operation and production rate for these high-production welders. Automatic loading, unloading, and inspection operations are illustrated. (The Taylor - Winfield Corp.)

For more data circle No. 30 on postcard

Strain Gages

Small, direct - reading, uniaxial strain indicators are described in a product data sheet. The gages are easy to read and install. The photoelastic strain gages need no external instrumentation or connections. The data sheet includes sections on gage function, specifications, fixtures and installation. (Baldwin-Lima-Hamilton Corp.)

For more data circle No. 31 on postcard

Transmissions

Standard transmissions, customized to each application, is the theme of an eight-page brochure. It describes heavy-duty transmissions with input torque capacities of 150 to 2500 ft lb. Examples of standard single speed, multiple speed, and right-angle drives are illustrated with complete lists of input torque capacities, speeds, and gear ratios. A wide variety of custom-designed transmission applications are shown. Also described and illustrated are various transmission arrangements for rotation, location, speed, multiple speeds, shifting, cooling, mounting, clutches, and output shafts. (Cotta Transmission Co.)

For more data circle No. 32 on postcard

Photocopy Papers

Describing and listing user applications, a six-page gatefold brochure also gives prices for diffusion-transfer photocopy papers and films. Included in the brochure is a variety of uses for each type of film and paper. Also briefly described are two of the most popular photocopiers in the company line. (Ampto, Inc.)

For more data circle No. 33 on postcard

Hard-to-Find Parts

Listings of a complete line of metal specialty products and production facilities are contained in a bulletin. Intended as a guide to cover major product classifications, the list includes unusual as well as standard fabricated, welded and machined metal component parts for industry. It also lists the main products manufactured at each of the company's main plants. (Commercial Shearing & Stamping Co.)

For more data circle No. 34 on postcard

Pumps

Centrifugal and turbine type pumps are illustrated and described in a four-page condensed bulletin. It includes features, typical applications, capacity and head range for each type of pump—turbine, nonclog, split case, sump, end suction and condensate return units. Capacities range from 1 to 9000 gpm and heads to 600 ft. (Aurora Pump Div., The New York Air Brake Co.)

For more data circle No. 35 on postcard

FREE LITERATURE

Controlled Pressure

A bulletin points out how proper valve selection and application can reduce hidden costs connected with the use of water in industry. It focuses attention on the pitfalls in allowing water pressures to go unregulated or poorly regulated. The bulletin also describes in detail how water reducing valves operate; and gives complete information on proper sizing procedures. (Leslie Co.)

For free copy circle No. 36 on postcard, p. 85

Rare Earths

Contained in a brochure is complete technical information about various chemicals, metals, and alloys of the rare-earth group of elements, thorium, scandium and yttrium. These elements are achieving importance in missile development and atomic energy. The eight-page brochure describes manufacture, and lists detailed properties and chemical analysis of more than 50 products. (Vitro Chemical Co.)

For free copy circle No. 37 on postcard, p. 85

Basic Clutches

Four basic series of general-purpose clutches are described in a condensed catalog. The clutches are used for indexing, backstopping, and over-running applications. The four clutch series cover a complete range of sizes and torque capacities from 50 in. lb to 136,500 ft lb. They range in size from 0.250-in. bore diam to 12.000 in. Their applications include delicate mechanisms up to heavy industrial equipment. (Formsprag Co.)

For free copy circle No. 38 on postcard, p. 85

Conveyor-Scale Units

The use of conveyor-scale systems for flow rate control and through-put measurement is covered in a four-page bulletin. The bulletin deals with the use of conveyor-scale systems in conjunction with flat-bed or trough-type conveyor-line systems, fixed or variable speed, to provide in-motion weight measurement. System operation is explained and illustrated with pictorial diagrams. A section of the bulletin describes the application of the systems to a variety of control functions in processing and formulating operations. (Weighing & Control Components, Inc.)

For free copy circle No. 39 on postcard, p. 85

Power Supplies

Features, applications and specifications of constant-voltage power supplies, with "slope control" for precision welding of space-age materials, are contained in a four-page brochure. The power supplies described include those for such processes as Heliarc (TIG), Sigma (MIG) including short arc, Unionmelt (submerged arc), and Unionarc (magnetic flux). (Glenn Pacific Power Supply Corp.)

For free copy circle No. 40 on postcard, p. 85

Laminates

Dealing with fabricated laminates, a four-page bulletin discusses some of the many applications and uses for fabricated parts—punched, machined, ground, drilled or turned from the laminate sheet, tubes and rods. (The Richardson Co.)

For free copy circle No. 41 on postcard, p. 85

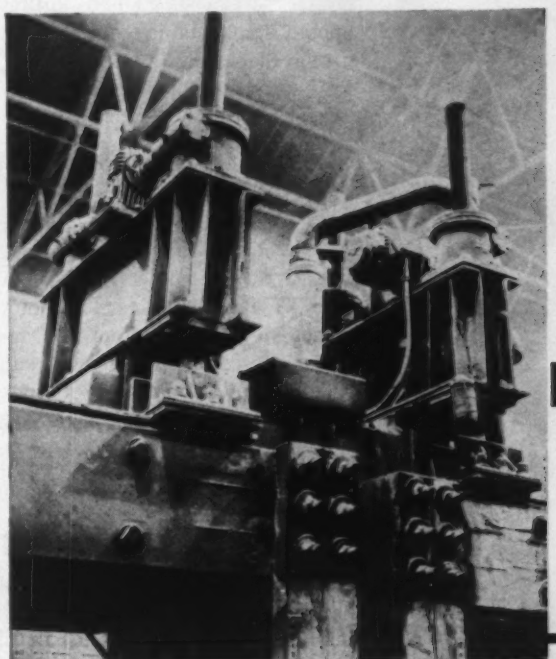
Copings

Complete technical and specification data, on warehoused copings and gravel stops, are detailed and illustrated in a new A.I.A. file brochure. The brochure covers all systems now available. (For free copy write on company letterhead to Reynolds Metals Co., Dept. PRD-24, Richmond 18, Va.)

High-Velocity Dryer

A four-page bulletin gives technical data on three high-velocity dryers. Air outlet velocities range from 15,000 to 20,000 fpm, with temperatures to 800°F and beyond in certain applications. Dryers may be manually or automatically controlled and are extremely flexible in operation. (J. O. Ross Engineering, Div. of Midland-Ross Corp.)

For free copy circle No. 42 on postcard, p. 85



100 million pounds per year

That's how much aluminum a modern reduction plant equipped with 1000 Cone-Drive **double-enveloping worm** gearmotors produces. Gearmotors control anodes and casings on the electric furnaces. Ambient temperatures to 300° F and constant reversing are encountered.

Versatile Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

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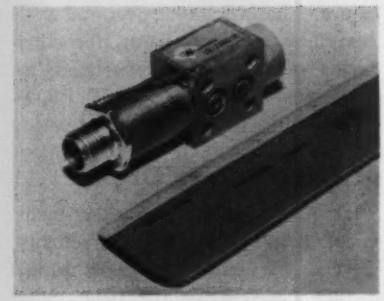
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

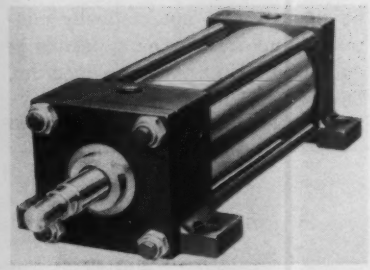
New Materials and Components



Valve Has No Reaction to Back Pressure

Suitable for operation with liquids or gases, a normally-closed, explosive-actuated valve contains a balanced piston. Explosive element has been fully qualified, and is suitable for a wide variety of space vehicle applications. The valve is rated at 4200 psi. Temperature range is from —65° to +160°F. But, it may be exposed to short-term temperatures up to +300°F. Insensitive to back pressure, the valve is designed for manifold mounting and is a zero-leak valve. Flow passage is 5/32 in., and its weight is 2.6 oz. (Pyronetics)

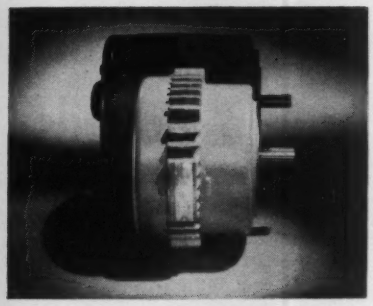
For more data circle No. 43 on postcard, p. 85



Double-Acting Cylinders Feature Many Advances

Quality in finish, appearance and workmanship, a line of double-acting, pneumatic and hydraulic cylinders uses full-floating cushions. The special two-stage cushion insures smooth deceleration of piston. Bore sizes available are: 1½, 2, 2½, 3¼, 4, 5, and 6 in. The cylinder's working media and maximum pressures are: air to 250 psi for all bores; oil to 1000 psi through 3¼-in. bore, 700 psi through 5-in. bore, and 600 psi on the 6-in. bore. Cylinder heads are made of cold-drawn steel. (Mead Specialties Co.)

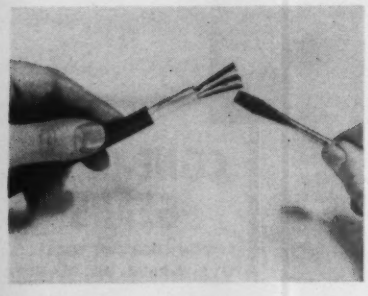
For more data circle No. 44 on postcard, p. 85



Thinline Motor Installs Easily

Designed for use on pumps, gears, hoists, and propeller-type fans, a thinline motor has NEMA type "C" face mounting. The motor comes in both dripproof and totally-enclosed constructions, with ratings from 1-5 hp at 1800 rpm, ¾-3 hp at 1200 rpm, and ½-2 hp at 900 rpm. The motor is as much as 7-in. shorter and up to 20-pct lighter than equivalent standard NEMA type "C" face round frame motors. The frame and end-shields are of rigid cast-iron construction. Compact design of this motor reduces overhang. (General Electric Co.)

For more data circle No. 45 on postcard, p. 85



Multi-Lead Wire Cuts Thermocouple Wiring Costs

Harnessing multiple pairs of thermocouple extension wires into special cables, reduces the cost of thermocouple wiring. The cables save space, cut material costs, and lower final installed costs. The extension wire is normally supplied with from 4 to 48 pairs of extension wire per cable, and in 1000-ft lengths. In standard designs of the extension wire, the multiple insulated wire pairs are cabled with aluminum-backed Mylar tape, and a choice of three different outside sheaths. All three sheaths make conduit unnecessary. (Pyrometer Co. of America, Inc.)

For more data circle No. 46 on postcard, p. 85

NEW SUPER STAINLESS STEELS SHED CORROSION

PH55A and PH55B are the new super stainless steel alloys developed by Cooper Alloy Corp. to resist those corrosion-erosion, corrosion-abrasion attacks which cannot be handled by most extisting alloys.

These alloys have high strength and high hardness even at temperatures elevated to 1000°F-1400°F. PH55A is particularly recommended for applications where pitting corrosion is the problem. PH55B, more ductile, is suited for applications where corrosion resistant parts are subject to stress and shock. Write today for Form PH55.

COOPER ALLOY

Corporation • Hillside, New Jersey

TWO NEW EXCLUSIVES BY

New ¼" Air Cooled SHORTY HEAVY-DUTY DRILL

SMALLEST, MOST COMPACT DRILL ON THE MARKET

New, too! ½" Reversible Special Drill!

Especially designed for telephone pole work, this new B&D tool is perfect wherever confined space or other special conditions call for a drill that backs itself out of the hole it has drilled. Just a flip of the switch and out comes the bit!

Gets into the tightest spots

Here's the drill that goes almost anywhere your hand will go—into tight corners, behind I-beams, into small enclosures. Shorty's offset head gives you finger clearance on flush jobs . . . gives you top control and pressure on every job!

Twin cooling fans keep housing comfortable to handle at all times. Full length paddle switch starts or stops no matter where you grip it. 60% more power. 15% less weight. 32% lower price. Try one soon.

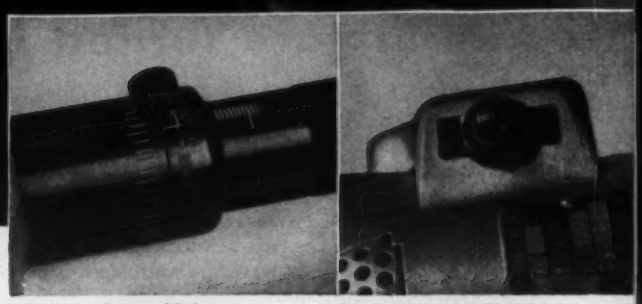
Drilling holes in cramped areas like a switch box is a cinch—with a ¼" Shorty drill.

Wherever your hand will go, your Shorty will drill—even blind behind I-beams!

BLACK & DECKER!

New
MICRO CLUTCH
SCRUGUN®

NO MARRED FINISHES, SCREWHEADS—OR BROKEN BITS



Adjusts to thousandths! Just a simple turn of the barrel gives you micrometer accuracy.

Reversible, too! A flip of the piggy-back switch backs out screws, nuts and bolts fast and easy.

Drives screws to depth set

A simple turn of the wrist sets your B&D Micro Clutch* Scrugun to give you *precisely* the depth you want. Want screws flush? Below the surface? Heads exposed? That's the way you get 'em—every time!

B&D's *exclusive* Micro Clutch lets you set depth in thousandths (.001) of an inch; stops driving screw when desired depth is reached—automatically! With ordinary care, it won't mar your work, damage screws or break bits. Try one soon.

*Pat. Pend.

50th YEAR

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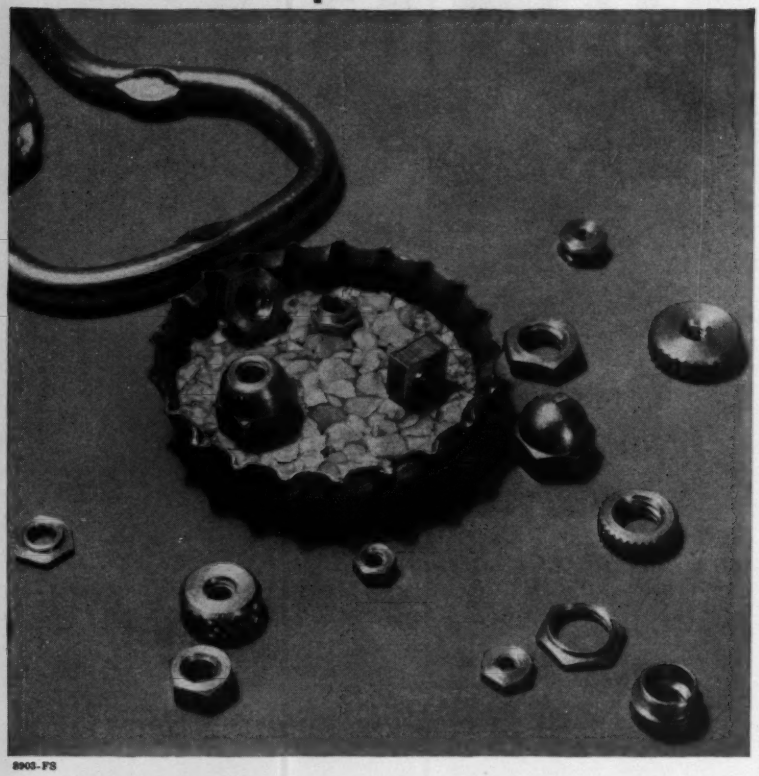


8903-FS

Fischer

miniature turned nuts

Working on the premise that only the best is good enough, Fischer has developed highly specialized production and quality assurance methods for precision miniature nuts. And to assure uniform accuracy and dependability, *Fischer maintains tolerances that exceed current industry standard specifications.* Result: Fischer turned nuts are solving fastening and assembly problems in all types of miniaturized electrical and electronic equipment.

Fischer can supply miniatures in standard, special and odd sizes or shapes ranging from ⅛" hexagon, with standard or special threads from No. "0". All are furnished cleaned, burrless and ready to use.

If you are looking for extreme accuracy and prompt "on schedule" delivery at competitive prices . . . let Fischer quote your next miniature nut order.

WRITE TODAY FOR BULLETIN M-600

there's no premium for precision at

Fischer SPECIAL MANUFACTURING CO.

445 MORGAN STREET • CINCINNATI 6, OHIO

DESIGN DIGEST

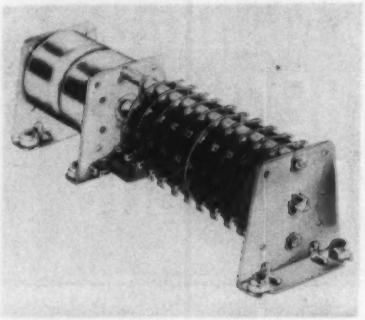
Ceramic Powders

Two ceramic powders, Corcast and Cortamp, can be formed into shapes used in hot tooling. First applications will be as tools, jigs and fixtures in the aircraft and missile industry, where shaping of exotic metals requires great heat and pressure. Corcast has a service temperature of 2500°F and compressive strength of 2000 to 3000 psi. The service temperature of ceramic-bonded Cortamp is above 4000°F; its compressive strength ranges from 10,000 to 12,000 psi. (Corning Glass Works)

For more data circle No. 47 on postcard, p. 85

Rotary Switch

Powered by a highly-reliable, long-life power unit, a rotary circuit selector or stepping switch offers manual setting to any position. Self-stepping is provided by a transistorized pulser incorporated into the switch package. The pulser meets all environmental requirements of



MIL-E-5272. Standard stepping rate is 6 to 8 pulses per second, but faster stepping can be provided. Applications of the switch include: stepping, counting, adding, subtracting, programming, and sequencing. (Ledex Inc.)

For more data circle No. 48 on postcard, p. 85

Gate Valves

With a new flexible wedge disk, a line of 150- and 300-lb steel gate valves is suited for use on air, steam, water, gas, oil and other similar fluids. The working pressure of the 150-lb valve ranges from 40 psi at 1000°F to 275 psi

STEELWELD PRESS BRAKES

Hydraulic and Mechanical

Steelweld 400 Ton Hydraulic Press Brake. Bed and ram length 14'-0".

WHATEVER your requirements, there is a Steelweld Press Brake —hydraulic or mechanical—to best serve your needs. Available in all sizes to 2000 tons. For plate thicknesses to 2". For lengths to 30'-0".

Each type of machine, mechanical or hydraulic, has its particular advantages. The work to be performed is the determining factor for most satisfactory machine selection.

As a manufacturer of both types of press brakes, we are in a position to offer you either one without partiality. Therefore, we urge you to get the complete story, the Steelweld story, when considering the purchase of a new brake. Ask for free catalogs.

Hydraulic Press Brakes
Catalog No. 2024

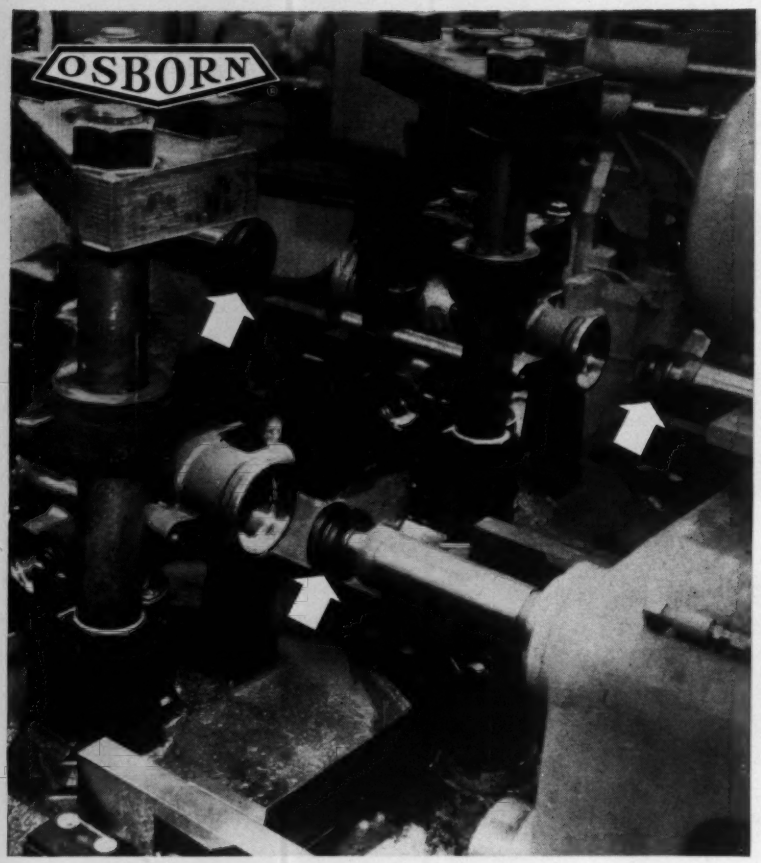
Mechanical Press Brakes
Catalog No. 2023

Steelweld 320 Ton Mechanical Press Brake. Bed and ram length 12'-2".

STEELWELD
Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4875 E. 281 ST. • WICKLIFFE, OHIO



In this automatic twin setup, Osborn TY® brushes are advanced into both ends of a pair of valve housings without surface contact. The drive head oscillates the brushes around the ring groove contours, then retracts . . . all automatically.

HIDDEN BURRS knocked off

in 5½ seconds with new OSBORN TY® Power Brushes

This large manufacturer of automotive power steering equipment uses Osborn TY® brushes to deburr double internal ring grooves in both ends of these valve housings. Former off-hand methods required lots of time . . . effort. Still, high quality standards were hard to obtain.

Today deburring is done automatically with Osborn TY brushes . . . in just 5½ seconds. *High quality results are uniform . . . consistent.* These tough, durable TY brushes operate 16 hours a day in a 96-station automatic transfer machine. Even in this rugged service, brush life runs 2½ to 3½ weeks.

An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step toward improving your metal finishing operations of every description—deburring, cleaning, polishing, precision blending. Write or phone for details. *The Osborn Manufacturing Company, Dept. F-97, Cleveland 14, Ohio.* Phone ENdicott 1-1900.

Osborn Brushes

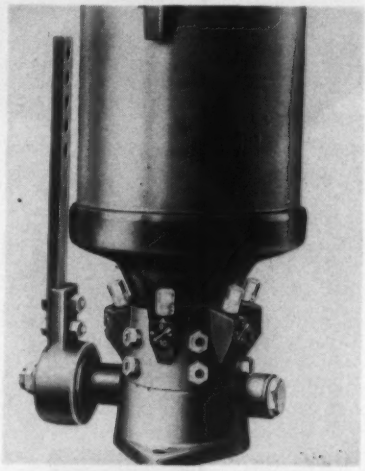
Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

at 100°F. The 300-lb valve has a range from 85 to 720 psi at a similar temperature range. The valves operate easily, even if closed while hot, and then permitted to cool. The valve's body and bonnet are cast carbon steel with heavy metal sections. (Crane Co.)

For more data circle No. 49 on postcard, p. 85

Lubrication Pump

A centralized lubrication pump delivers exact amounts of grease or oil to all bearing points through individual lines. The positive-pressure, valveless pump is designed primarily for machinery requiring comparatively small amounts of grease to be applied constantly in many areas. It can easily be



mounted on such equipment as traveling cranes, conveyors, presses, mining and mill installations. It can be operated either by direct coupled motor or by a lever attached to some moving part of the equipment being lubricated, thus providing lubrication only when needed. (Research Appliance Co.)

For more data circle No. 50 on postcard, p. 85

Aluminum Welding Wire

An aluminum welding wire is specifically designed as an all-purpose filler metal for both gas and electric fusion welding. Its principal alloying element is 5-pct silicon. It will join most aluminum alloys including 5052, 6053 and

... Results of a Superior Beginning

The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common . . . their superior quality. This, of course, is related to the inherent fineness of the materials.

The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

Whatever the type, size or characteristics you require — Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

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Roebling... Your Product is Better for it

Steel Warehouse Handles 3500 Stock Items with "TRAK-RAK" Crane ——— *Reduces Operating Costs... Speeds Service*

1. "TRAK-RAK" Crane moving into aisle between double rows of racks. Racks are 20 ft. high. Distance from floor to underside of roof truss is 30 ft. Aisle width is 5 ft.-4 in.

Edgcomb Steel of New England, Inc. warehouses 3500 different items of steel, stainless steel, brass, and aluminum bar stock in an area 60 feet wide, 27 feet high, and 160 feet long.

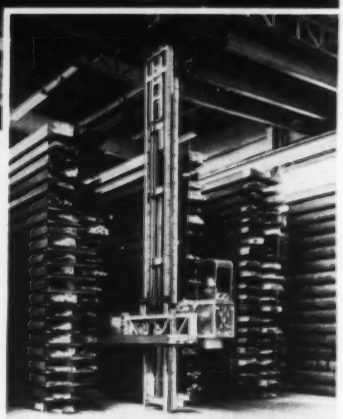
ONE man and a "TRAK-RAK" Crane serve the five double rows and two single rows of "Christmas Tree" racks which hold 2700 storage trays. Edgcomb processes approximately 2500 to 3000 orders per month, and the company reports very favorable reductions in operating costs and faster order processing and delivery.

Edgcomb's "TRAK-RAK" Crane has a traveling bridge (Photo 1) which spans the storage bay, and an overhead trolley from which is suspended an electrically operated rotating column equipped with a carriage for handling the storage trays. All operations of the crane and carriage, which rotates, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage. Safety switches prevent the column from running into a rack and permit full rotation only when the unit is safely beyond the end of the racks.

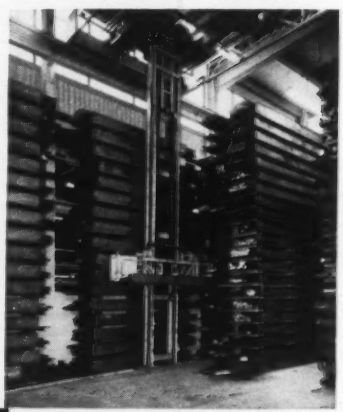
Hundreds of "TRAK-RAK" installations, designed to meet the user's particular requirements are in use today. They are handling many types of material and loads with great speed and economy. Specific advantages the "TRAK-RAK" System of vertical storage and handling brings to the user are:

1. **Maximum utilization of the cube to permit storing and handling more material in less floor area.**
2. **Faster material movement in and out of storage.**
3. **Reduction in personnel and lower labor costs.**
4. **Improved safety, better housekeeping, precise inventory control.**

Take the first step toward faster, more efficient material storage and handling now. Write for complete details on "TRAK-RAK." Chicago Tramrail Engineers are available to discuss your handling problem with you at any time—and at no obligation to you.



Crane with operator, who rides with carriage, emerging from aisle with loaded stock tray.



Picking up or depositing stock trays on the rack is a fast, safe operation. Trays and rack sections are color coded for quick location and identification.

CHICAGO TRAMRAIL CORPORATION
1312 SOUTH KOSTNER AVENUE • CHICAGO 23, ILLINOIS

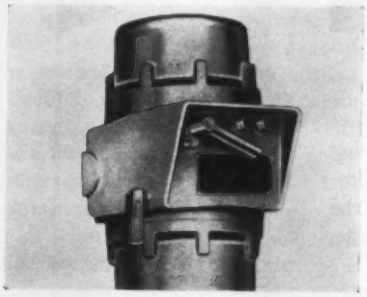
Specialists in the design, manufacture and installation of material handling systems for steel warehouses and other industries

6061 wrought alloys and cast aluminum alloys. The wire produces a wider solidification range because it has a lower melting point than most aluminum alloys. This feature enables the metal to fill solidification voids without setting up stresses in the parent metal. Stresses are relieved in the molten welded filler and not in the joined parts. (American Brazing Alloys Corp.)

For more data circle No. 51 on postcard, p. 85

Motor Starters

A new line of motor starters, circuit breakers, and combinations of both is explosion proof, dust tight, and weather resistant for indoor and outdoor use under severe environmental conditions. Features include: cast aluminum threaded enclosures, with stainless-steel exterior hardware for positive weather protection and corrosion resistance, as well as ease of handling and low maintenance cost. The

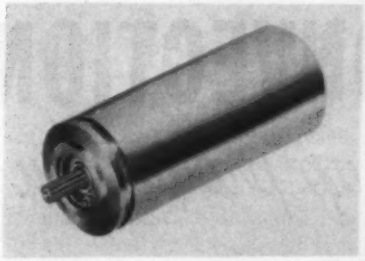


enclosure consists of a central body externally-threaded at top to accept the internally-threaded overlapping dome. The dome provides natural shedding of water or process drippings. The body is oppositely threaded at the bottom. Both domes have a safety interlock to prevent inadvertent opening of the enclosure. Other features include adjustable starter and breaker mounting frames. (The Pyle-National Co.)

For more data circle No. 52 on postcard, p. 85

Tach Generator

For damping in position servo and similar applications, a motor tach generator achieves additional reliability by exiting leads from side; also, by heliarc welding back end in three places. The —55° to +125°C motor tach generator



meets applicable portions of MIL-E-17087 and MIL-E-5272, has stainless steel housing and weighs 7 oz. (John Oster Mfg. Co.)

For more data circle No. 53 on postcard, p. 85

Bin Vibrators

Impacting at both top and bottom of the stroke, a line of bin vibrators can be installed on bin walls of about ⅜-in. thickness and of 20-ton capacity. The concentrated vibratory action is more independent of objects to which it is attached than competitive units. The unit's hammer delivers 7200 impacts per minute at 60 cycles per second. The vibrators are recommended for moving stubborn masses of granular, lumpy or powdered materials in the heavier bins or hoppers. (Eriez Mfg. Co.)

For more data circle No. 54 on postcard, p. 85

Fastener

A combination nut and helical spring washer, permanently held together, is free to rotate when pressure is applied. The outstanding feature of the new fastener is the incorporation of the helical spring washer, designed to give a greater reactive range and higher spring tension than any other type of nut and washer assembly. (Eaton Mfg. Co.)

For more data circle No. 55 on postcard, p. 85

Flexible Shafts

A heavy-duty flexible shaft has been designed to transmit a considerable amount of rotary power over any curved path. It has many applications in manufacturing plants and for providing power take-off auxiliary drives on trucks and tractor trailers. The shaft has a 1-in. diam core which is capable of power transmission up to 760 in.-lb of torque at a speed of 600 rpm. The flexible shaft is equipped with a splined slip coupling at one end. The slip coupling will slide back and forth under load, and so take care of slight changes in length caused by varying load conditions. (Stow Mfg. Co.)

For more data circle No. 56 on postcard, p. 85

Set Screws

When applied in a gear or hub, and tightened to a basic shaft, a nylon-tipped set screw does not mark or mar the shaft. The nylon tip has full-face contact rather than 2-point contact, as in conventional cup-point set screws. When locked in place, the nylon material, being soft, takes the shape of the curved shaft, and imbeds itself in the thread hole, thus offering a self-locked washer effect. (PIC Design Corp.)

For more data circle No. 57 on postcard, p. 85

QUANTITY PRODUCTION OF GREY IRON CASTINGS

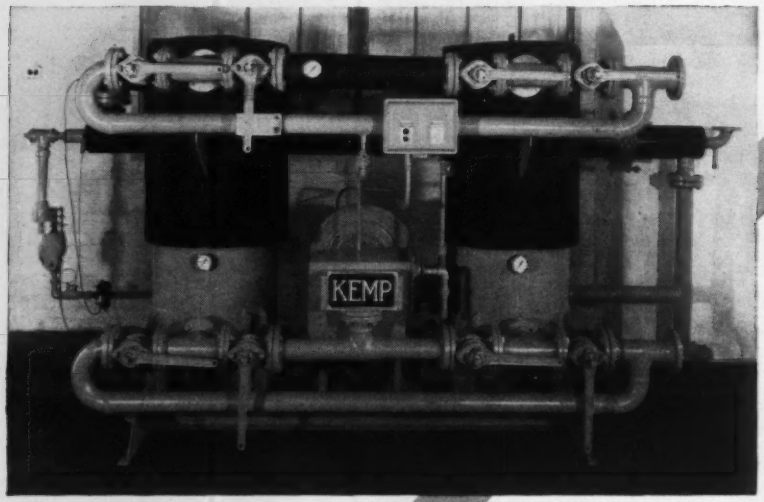
ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

For precise control of metal-working atmospheres (drying Nitrogen, Hydrogen and annealing gases to –60° F. dewpoints)

...KEMP CONVECTION DRYERS

cut down-time, up production-time 4 ways!



1 Full Reactivation . . . assures unmatched drying power for air, gases or liquids. Exclusive external design allows complete reactivation unaffected by variations in flow rate or dry gas needs.

2 Low Pressure Loss . . . is another Kemp Convection Dryer cost-saving feature. Unique full-flow design of drying towers and connections assures the least pressure loss, lower operating cost.

3 Automatic Control . . . is achieved once you pre-set the program timer. The reactivation cycle of heating and cooling then becomes automatic. All Kemp Dryers are easily switched to manual control, too.

4 Safety-proved Operation . . . is a fact with any Kemp Dryer. Check and relief valves, an alarm circuit . . . all protect the entire system. Write for Bulletin D-106 for further details . . . or contact your local Kemp Representative.

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KEMP OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.

The Iron Age Summary

Steel Earnings in for a Drop

The decline in steel sales means a sharp drop in earnings for the current quarter.

Many companies will be faced with the alternative of cutting dividends or spending plans.

■ Steel earnings are likely to drop 15 to 20 pct in the current quarter. The sharp decline in the steel market may place many steel companies in a squeeze between continuing the rate of dividend payments and keeping up with capital spending plans.

The Alternative—With the third quarter outlook still a big question mark, some slowdown in future capital spending plans is likely. The alternative for some companies will be a cut in dividend payments.

However, because of commitments and the pressure for cost reduction, no sharp cutoff in capital spending is expected. Most mills say they are going through with all planned programs. But some stretchouts are likely.

To illustrate the dividend-spending squeeze, the steel industry is carrying a long-term debt equal to 20 pct of its total investment. This makes it unlikely that any of the companies will take on added debt for expansion.

How Much to Spend?—At the same time, a typical mill has paid out 80 pct of its earnings in dividends over the 1958-59 period. This leaves little cash for further capital programs. Another mill can meet its dividends and capital requirements with a rate of 70 pct of capacity. This is about what the current quarter will average, but with the rate still in a decline.

The current quarter resembles the last quarter of 1958 in some respects. The operating rate for that period was 73 pct, which is close to what the industry will hit in the present three months. However, employment costs have risen since 1958.

And it isn't known how much rush demands are adding to mill costs. In addition, a lot of steel production in the second quarter went into mill inventories, and will not show up in sales.

No Uniformity—However, there is no uniformity in the second quarter earnings outlook. Some of the lower-cost mills can operate at an even lower rate and still show respectable earnings. But some high-cost mills' profits have fallen off fast.

Specialty mills are hardest hit of all. The demand for stainless and other specialty products was depressed earlier in the year and the profit pinch came early for producers of these steels.

Market Outlook—In the general market outlook, the drop in new orders has hit bottom, but there is no rapid upturn in sight for some weeks.

Seasonal factors, strict inventory control, and some slowdowns in steel consuming industries still dominate the market. The operating rate is likely to continue a sharp decline through June and into July.

But there is a possibility of a sharp jump in operations when the upturn comes. With consumer inventories at the lowest possible level, an upturn in buying is likely to result in a quick upturn in the operating rate in August.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,767	1,906	2,137	2,653
Ingot Index				
(1947-1949=100)	108.9	118.7	133.0	165.2
Operating Rates				
North East Coast	69.0	71.0	81.0	94.0
Buffalo	68.0	76.0	78.0	98.0
Pittsburgh	60.0	69.0	76.0	96.0
Youngstown	20.0	41.0	52.0	91.0
Cleveland	72.0	76.0	74.0	94.0
Detroit	71.0	81.0	97.0	97.0
Chicago	72.0	70.0	76.0	93.0
Cincinnati	59.0	54.0	84.0	84.0
St. Louis	82.0	79.0	88.0	103.0
South	65.0	67.0	77.0	91.0
West	67.0	69.0	73.0	93.0
U. S. Rate	62.0†	66.9	75.0	93.7

*Revised †IRON AGE Estimate
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$32.50	$32.50	$33.17	$37.17
No. 2 bundles	$21.83	$22.17	$23.17	$25.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	100.125	99.50	99.25	104.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Buying Becomes Part of Selling

DoAll Co. has made its purchasing department a part of its over-all selling operation.

The system keeps costs low and allows a close check on inventories at all distribution points.

■ How closely does your purchasing department tie in with company sales plans? K. R. Munro, who directs purchases for DoAll Company's 38 sales stores, has made purchasing an integral part of the total selling operation.

Mr. Munro is charged with the stock of 22,000 different items, in minimum inventory accounts, in the national chain of DoAll distribution points.

DoAll manufactures machine tools, gages, cutting tools and other industrial supplies.

It sounds like quite a job. But a 10 man staff handles all of it. This breaks down into six buyers, two clerks, two general assignees, and purchaser Munro.

Controlled Stock — To get this kind of manpower utilization, the purchasing department depends on a card inventory-and-order system. Inventory in the field is at a controlled 90 days stock for most items. Reorder points are automatically indicated on the stock cards. When a buyer enters an order for new items, the central purchasing unit at Des Plaines, Ill., notes the stock withdrawal on its inventory cards. Reorder point for each item is checked at the moment the stock withdrawal is entered on the cards.

It would seem that Mr. Munro is bucking the trends. His buyers prefer a continuous flow of small orders, rather than lumping demands into a single large lot size. But the system works, costs are low.

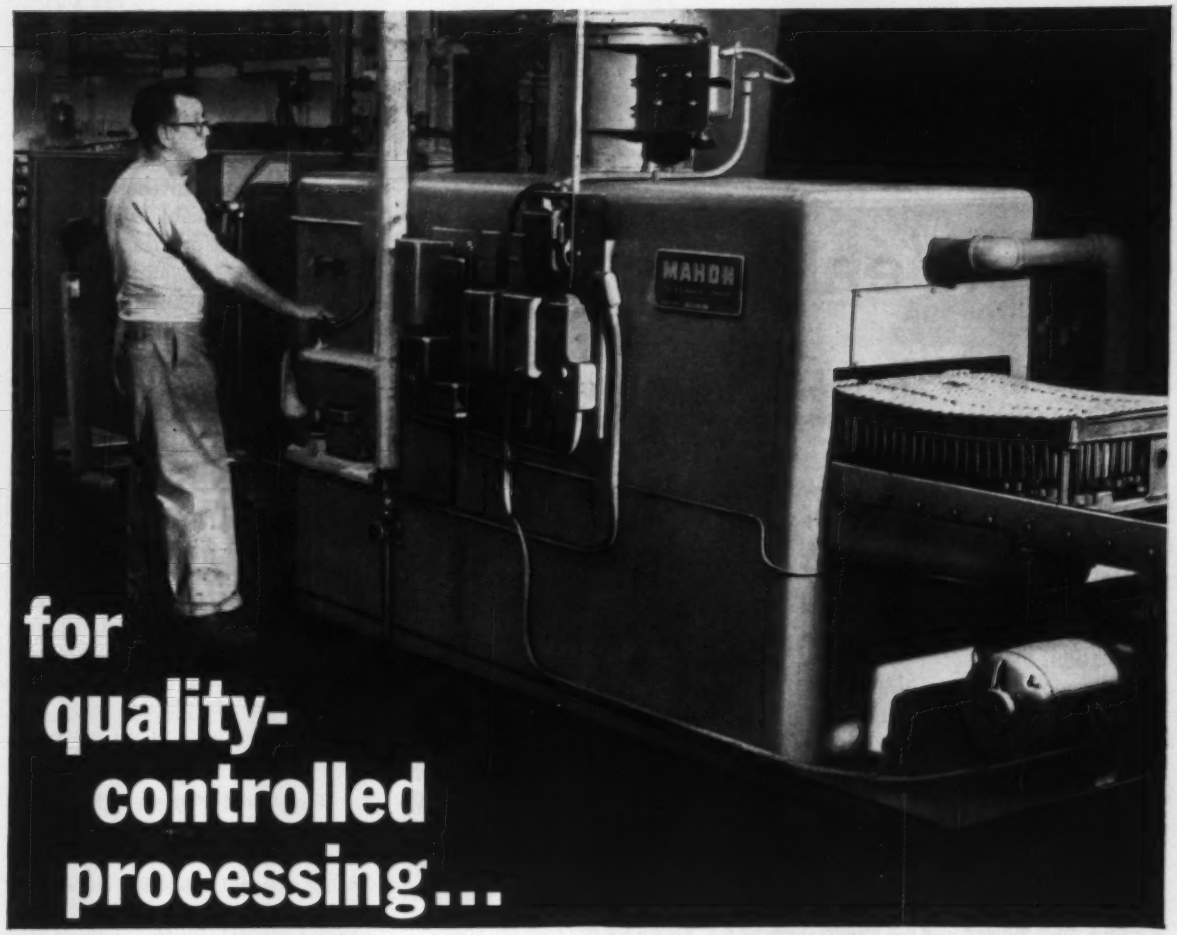
How It Works—Here is the basic philosophy: Inventories in the field and at DoAll, Des Plaines, are held at minimum levels. A guiding rule is that the field store manager will tend to over-order. The purchasing department is watching field store inventory levels. By the same token, inventory levels at Des Plaines are minimum. Using a close order system, the central purchasing department keeps its inventories back among its suppliers, preferably, as in-process rather than in-storage inventories even at the supplier level. Result: Drastic cuts in the total inventory carrying cost.

Cost Check—Turnover is a direct function of the success of purchasing. In many firms, turnover is regarded as largely a sales department problem. Mr. Munro seeks to use it as a check on inventory carrying costs.

Close Coordination — Ordering plans are coordinated closely with promotion plans developed by the sales and promotion departments. Stocks of an item that will be given special promotion are advance ordered, and individual orders are hiked by the expected sales increase. Amount of the increase of stocks of the item is a percentage that is based on past sales history, market appraisals of the item's probable sales increase, and the amount of promotion given the item.

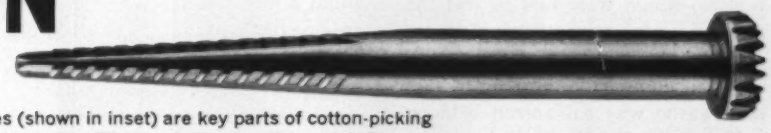
The stock at each of the 38 field stores is given a fulldress overhaul by the central purchasing department every 12 months. Sales over the past year are checked as an indicator whether stocks of an item should be boosted or cut-back.

K. R. MUNRO: He keeps tabs on 22,000 different items.



for quality-controlled processing... industrial equipment by MAHON

'cotton-picking' spindles thoroughly cleaned 500 at a time for International Harvester



Hardened, chromium-plated, barbed spindles (shown in inset) are key parts of cotton-picking machines made by International Harvester Company. These spindles are the metal 'fingers' that actually field-pick the cotton—several million are produced each year at IH's Memphis, Tenn., Works. A critical step in processing these parts is thorough cleaning before heat treating and plating. Removal of oil, grease, and foreign matter from the spindle surfaces is essential to insure uniform hardness . . . and long product life.

For **"quality-controlled processing"** the spindles are washed and dried in Mahon equipment. This special machine, developed for International Harvester from Mahon Industrial Equipment Division 'almost-standard' designs, means production efficiency . . . product quality . . . faster delivery and reasonable cost. Over the years Mahon equipment is your best investment. Call in a Mahon industrial engineer; let him prove why.

In cleaning a 500-piece-load of cotton-picking spindles, the two-stage Mahon machine washes the parts with detergent in hot water (at 180°F); then hot-air dries the load at (250°F). Automatic cycle time is about 15 minutes per load.

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MAHON

Galvanized Shows First Weakness

For the first time since early in 1958, galvanized shows signs of weakness.

But a strong pickup is expected when automakers start producing their new models.

■ Demand for galvanized sheet has gone slack for the first time since early 1958.

For more than two years, galvanized has been on the upswing. It was the only product to show a shipping increase from 1957 to 1958. Demand exceeded supply all through 1959.

Now, finally, supply has caught up with demand. Like other flat-rolled items, galvanized seems headed for about two months of order depression. However, the order lag could be shorter.

Warehouse Pickup—July orders for galvanized are better than June's were at a comparable time. And there are reports that warehouses, which were first to feel the decline, are now getting more orders.

New compact automobiles are one reason why galvanized held up as long as it did. Ford's Falcon uses galvanized sheets in side members, rocker panels, front and rear rails, and most cross members. Similar use is made in the Comet. Production of these two cars is well past 350,000 units.

More compacts and increased use by automakers for standard size 1961 model cars could put galvanized back in the shortage class.

Sheet and Strip — Cold-rolled sheets are booked through June at **East Coast** mills, but July orders are coming in slowly. Hot-rolled orders are very weak and one mill intends to shut down its hot-rolled mill for a week. Automotive buyers are still ordering cold-rolled sheets from mills in the **Cleveland** district.

But auto users in **Chicago** have gone out of the market after placing extra orders a few weeks ago. Reports from that district say that some material can be obtained in as little as two weeks. And some strip producers, overbooked as recently as April, are going after business requiring only three weeks for delivery.

Bars — Cutbacks in automotive buying have hit **Chicago** bar mills hard. Lack of support from oil country goods has also contributed to weakness in the bar market. Some hot-rolled bar mills are operating at 50 pct of capacity or lower.

Cold-finished bar mills aren't in much better shape with business running below forecasts made only about a month ago. Generally, bars are one of the weakest grades in the **Midwest.**

PURCHASING AGENT'S CHECKLIST

Metals compete against other materials at Design Engineering Show. P. 25

Inventory control handled by IBM's new Management Operating System. P. 29

Brilliant anodized finish produced by casting high-purity aluminum. P. 30

Wire—Mills are feeling for the bottom of the market. And they ought to find it next month. July should be the year's low, according to market sources. They point to the fact that customers will still be liquidating inventories. And many plants which will close for vacations aren't ordering new stock. But the mills are looking for improvement in August.

Auto ordering for new models is expected to spark the rise for **Cleveland** mills. Roadbuilding consumption of welded wire fabric continues to lag because many projects are being held up due to a lack of government funds.

Small wire mills in the **Chicago** district are laying down finished products in anticipation of a sharp rise in business in August. Foreign wire products are coming into port marketing areas at a high rate. Some estimates place foreign wire and wire products at 40 pct of U. S. consumption.

Shapes and Plates — There are few stock orders for plates at **East Coast** mills. "Tailored" sizes are being ordered, and the material is being shipped directly to the job site. A **German** mill got part of a recent order for Navy ship plate, underbidding U. S. mills by about $40 a ton. It is believed to be the first time the Germans have entered this particular market. However, **Japanese** mills have been supplying heavy plate to the Navy for some time.

Orders for structurals at **Chicago** mills continue at improved levels of the past four to six weeks. April bookings of fabricated structural steel continued to climb for the third consecutive month, according to the American Institute of Steel Construction. April orders for 344,-944 tons were 17 pct greater than the year-ago month and represent a 56 pct gain over January, 1960.

Stainless—Shipments of stainless products in the first quarter of 1960 totaled 193,056 net tons. In the same period of 1959 they totaled 172,510 net tons.

COMPARISON OF PRICES

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

(Effective May 31, 1960)

	May 31 1960	May 24 1960	May 3 1960	June 2 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Bas price	6.196¢	6.196¢	6.196¢	6.196¢

(Effective May 31, 1960)

	May 31 1960	May 24 1960	May 3 1960	June 2 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$33.50	$33.50	$34.50	$41.50
No. 1 steel, Phila. area	34.50	34.50	34.50	35.50
No. 1 steel, Chicago	29.50	29.50	30.50	34.50
No. 1 bundles, Detroit	27.50*	29.50	30.50	35.50
Low phos., Youngstown	35.50*	36.50	36.50	41.50
No. 1 mach'y cast, Pittsburgh	49.50*	50.50	50.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	49.50*	50.50	51.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.50	$32.50	$33.17	$37.17
No. 2 bundles	21.83*	22.17	23.17	25.17
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin Straits, N. Y.	100.125	99.625	99.25	104.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Write for Bulletin 120 and 132

NIAGARA BLOWER COMPANY

Dept. IA-6, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities

Industrial Lists Slide Off

New industrial lists react to the declining interest in scrap buying.

In several major markets, new lists go $2 or more below last month's prices.

■ Prices for new industrial lists reflect the weakness of the market.

With scrap generation running ahead of scrap buying and use, prices declined in several markets. In the absence of mill buying, demand has fallen off.

At Pittsburgh, factory bundles, reacting to the drop in industrial lists, went to brokers $2.50 a ton lower. In Chicago, the trend was mixed. In an uncertain market, some tonnage moved at prices both above and below existing prices. But other tonnage moved at quoted prices.

Industrial lists were down an average of $2.50 a ton at Detroit. A decline of $2 was reported for auto lists in the Cleveland area.

The lack of strength in the bundle market brought a decline in The IRON AGE No. 2 Bundles Composite. It dropped 34¢ to $21.83.

Pittsburgh—Prices for industrial lists took their expected dive, pulling down prices of related grades. Local factory bundles went for $2.50 below last month. But new price was the same as that paid for a special offering a few days ago. Brokers had expected an ever bigger drop on the new lists. Scrap is now moving into yards at a slightly faster rate. However, no one seems in the mood to stockpile heavily for a stronger market. Industrial scrap generation is still running ahead of scrap buying and use.

Chicago — In the absence of strong mill or export activity, the market is bearish. Steelmaking grades held at existing prices. Stainless grades slipped in price. Some factory bundles moved at prices both above and below last month's sales. But tonnage also moved at quoted prices. Scrap receipts by yards are dwindling. Mill stocks of scrap remain high. Demand for cast grades has weakened.

Philadelphia—Except for export sales, the market is lifeless. Mill buying is at a standstill. Foundry grades are moving slowly. Loadings for export are keeping supplies pretty well cleaned out. At times, the demand for scrap at the docks puts a strain on available supplies. Some dealers are convinced the export market may lose some of its steam after June. This week some railroad and cast grades are down $1 to $2.

New York — Export activity which has been holding up this market is starting to slow down. Most of the movement now is on old orders. New orders are getting hard to come by. The price of No. 1 heavy melting is off $1. Cast grades are unchanged. But there are some signs of weakness. Many dealers expect cast prices to drop in a week or so.

Detroit—June industrial lists fell an average of $2.50 a ton. In the past 10 days, several openhearths and a blast furnace in the area have closed down. Dealers and brokers say no new mill orders for scrap are out. The drop in mill operations probably was a factor in lowering industrial lists.

Cleveland — The market weakened further with auto lists down $2 and production due for an additional decline. In the Valley, electric furnace scrap is moving to one consumer, but heavy melting is not being taken. As a result, heavy melting is down $2.

St. Louis—Railroad and industrial offerings are keeping prices in this market in a depressed state. Demand is very light. Dealers who previously thought the bottom had been reached now fear a further easing in prices.

Cincinnati—Dealer prices are off about $2 and could slide more. A slow market is expected for June with only limited buying. The major area industrial list went to a mill for under $31. This was about $3 below month-ago levels. Other lists were off $2 to $4.

Birmingham—Buying increased this week with the settlement of the long U. S. Pipe & Foundry strike and the return to the market of some Anniston pipe foundries. Prices remained unchanged. Openhearth and electric furnaces are still out of the market.

Buffalo — Inactivity continues. No sales are expected until June orders are placed. Trade sources indicate these sales should be around current price levels.

Boston — The market remains dull. Sales activity is at a standstill. Prices are unchanged, with some fixed on an appraisal basis.

West Coast—June and July business looks good for exporters. But major mill buying is practically nil. The mills are reducing June production schedules. No. 1 cupola cast is very strong in the Los Angeles market. Prices are unchanged.

Houston—The market is quiet with prices unchanged. Operating rate for the district's mill is depressed, lessening the need for scrap. Dealers and brokers are pessimistic.

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West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

SCRAP PRICES *(Effective May 31, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate.	40.00 to 41.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	57.00 to 58.00
RR specialties	47.00 to 48.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids.	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids.	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs plate, ¼ in. and heavier	36.00 to 37.00
Low phos. 2 ft and under.	34.00 to 35.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	51.00 to 52.00
Rails 2 ft and under	50.00 to 51.00
Angles and splice bars	43.00 to 44.00
RR steel car axles	49.00 to 50.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	35.00 to 36.00
Malleable	47.00 to 48.00
Stove plate	38.00 to 39.00
Steel car wheels	40.00 to 41.00
Stainless	
18-8 bundles and solids.	180.00 to 190.00
18-8 turnings	90.00 to 95.00
430 bundles and solids.	90.00 to 95.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings.	25.00 to 26.00
Low phos. 5 ft and under.	37.00 to 38.00
Low phos. 2 ft punch'gs.	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	41.00 to 42.00
Rails, 18 in. and under.	56.00 to 57.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	41.00 to 42.00
Cast iron car wheels	43.00 to 44.00
Malleable	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	19.00 to 20.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	35.00 to 36.00
Rails, random length	45.00 to 46.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast.	36.00 to 37.00
Hvy. breakable cast.	35.00 to 36.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	36.00 to 37.00
Drop forge flashings	30.00 to 31.00
Low phos. punch'gs plate.	32.00 to 33.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	34.50 to 35.50
Rails 2 ft and under	54.00 to 55.00
Rails 18 in. and under	55.00 to 56.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	52.00 to 53.00
No. 1 machinery cast.	52.00 to 53.00
Stove plate	41.00 to 42.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	195.00 to 200.00
18-8 turnings	90.00 to 95.00
430 bundles	95.00 to 100.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos, plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	16.00 to 17.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	41.00 to 42.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	39.00 to 40.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	50.00 to 51.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft.	37.00 to 38.00
No. 1 RR hvy. melting	30.00 to 31.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks.	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings.	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	185.00 to 195.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	25.00 to 26.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	30.00 to 31.00
Mixed cupola cast.	34.00 to 35.00
Automotive cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids.	175.00 to 180.00
18-8 turnings	60.00 to 65.00
430 bundles and solids.	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.50 to $25.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.50 to 25.50
No. 2 bundles	13.00 to 14.00
No. 1 busheling	24.50 to 25.50
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings.	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

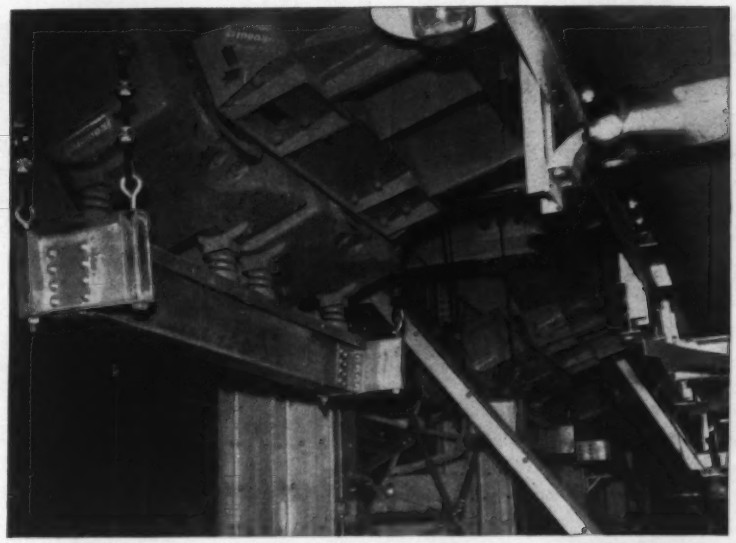
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Bush., new fact., prep'd	32.25
Bush., new fact., unprep'd	23.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn	13.00
Cast scrap	43.00

Houston

Brokers buying prices per gross ton on cars:

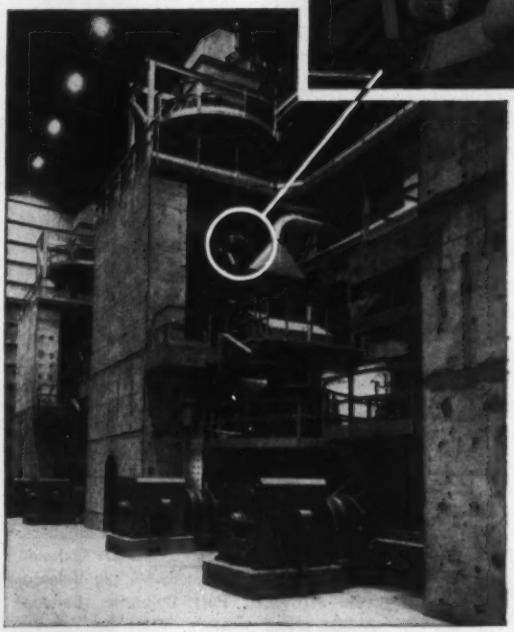
No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	15.00
Shoveling turnings	17.00
Cut structural plate 2 ft & under	$41.00 to 42.00
Unstripped motor blocks.	29.00 to 30.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	26.00 to 27.00



Jeffrey feeders move coarse ore from surge bin to cone crushers. Balanced vibration assures quiet operation, definite control, low operating and maintenance costs.

Battery of Jeffrey feeders serves hungry taconite crushers

Jeffrey feeders at bottom of cone crusher move ore to next crushing stage.



Into this stand of cone crushers passes a steady flow of coarse taconite ore, fed by a battery of 36 Jeffrey vibrating feeders. Fine ore is fed by Jeffrey vibrating feeders to screens ahead of the short head crushers.

Dependability of Jeffrey equipment helps move materials at a 24 hour-a-day, year 'round pace. *Efficiency* of Jeffrey equipment helps make the whole operation economical. Use Jeffrey experience on your materials handling problems. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

UN Tin Conference Studies New Pact

United Nations Tin Conference is working on a new International Tin Agreement.

Many issues remain to be resolved, but a new pact is likely to result.

■ The opening, public sessions of the United Nations Tin Conference, which convened last week at UN headquarters, were models of agreement and parliamentary procedure.

Only when the Russian observer got tangled up in his statistics of now much tin the USSR sold in the Free World in 1959 was there the slightest sign of strain.

Time for Decision—But this tranquility is not likely to carry over into the closed sessions which began late last week.

The primary function of this tin conference is to decide whether a new International Tin Agreement is desirable to succeed the current pact which runs out in June, 1961. If so the delegates will try to draw one up.

All the delegates agree the current agreement has stood up pretty well in the face of some trying market situations, and that another agreement is definitely in order. But all who spoke at public sessions insisted there were many spots for improvement.

Changes to Be Made—Another indication that things are likely to get a little warm behind the closed doors: An advance delegation worked out a draft of a new agreement strictly as a starting point for negotiations.

The working draft is restricted. But despite the lavish praise heaped publicly on the current agreement, one source close to the conference said it took him the better part of three days just to familiarize himself with the differences in the proposed pact.

Secrets Kept—Still another indication that delegates expect some wide disagreements: They are taking extra precautions to keep their closed sessions secret. All have been instructed, and have agreed, to say nothing at all about the conference except through a designated officer of the group.

Where will the main issues crop up? Indications now are that the basic disagreement will be between a bloc of producers and a bloc of consumers. The producers are against an agreement that is too rigid in its provisions. The consumers, on the other hand, would prefer to have as much as possible clearly and unquestionably set down in the agreement.

Export Controls — Within this framework are specific issues that clearly and admittedly are going to be difficult to resolve. One is the matter of export controls.

Under the current agreement, the producers had to curtail their exports of tin when an oversupply was threatened. Many one- and two-commodity economies were hit hard.

The Indonesian delegate said it forced the young and growing economy of his country to make "unjustifiable sacrifices." The Malayan delegate insisted that the new agreement would have to be made more attractive to the private industry that controls tin output in his country or a new agreement just wouldn't work. There was little doubt in the chamber that he referred to easier export controls.

The general feeling just before the closed sessions began was that the producers would agree to an export control clause, but only to be used in dire emergency.

Buffer Stock Issue—The operation of the buffer stock is another hot issue. The stock consists of metal which a manager may add to or sell from to stabilize the market. Thailand indicated that the burden of setting up and maintaining the stock was too heavy for producers, and that consumers should help a little more.

The floor and ceiling prices, at which the buffer stock manager must buy or sell to keep prices in this range is also a matter that will receive pointed attention.

Despite the sharp differences, the Conference is likely to wind up late in June with a new agreement.

Tin prices for the week. May 25—100.00; May 26—100.125; May 27—100.125; May 31—100.25*.
* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 110.**

IT PAYS TO STANDARDIZE ON **STANSCREW**

Stanscrew service helps insure precision of *Gilbarco* pumps

Gilbert & Barker Mfg. Company builds its famous Gilbarco gasoline pumps for oil companies large and small, and ships them to every state in the union as well as to most countries overseas. To insure precision and dependability of these pumps, great care must be taken in all assembly operations. Fasteners, for instance, must be torqued precisely to keep all components in perfect alignment.

Because of the critical importance of fasteners to its products, Gilbarco has selected Stanscrew heat-treated cap screws for such key applications as the positive displacement meter (shown in the insert). Stanscrew fastener specialists were happy to assist Gilbarco engineers in determining the right fastener with the correct torque to assure trouble-free service.

Gilbert & Barker is one of a long roster of honored names in American industry who have found it pays to standardize on Stanscrew. A product of unsurpassed quality . . . a broad selection of more than 5,500 different fasteners . . . prompt service through local distributors, backed by complete stocks at three conveniently located plants . . . these are a few of the reasons Stanscrew means greater value in fasteners.

Stanscrew's experienced fastener specialists can often suggest ways to improve your assembly procedures. Your local Stanscrew distributor will be happy to arrange a prompt visit. Call him today.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅞	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod..... 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be.$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismouth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.50
Calcium, 99.9% small lots .....$ 4.55
Chromium, 99.8% metallic base....$ 1.31
Cobalt, 97-99% (per lb)....$1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined .....29.95 to 36.95
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

(Effective May 27, 1960)

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¼
- No. 2 copper wire 24
- Light copper 21¾
- *Refinery brass 22
- Copper bearing material 20¾

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 23¾
- Light copper 21½
- No. 1 composition 20¼
- No. 1 comp. turnings 19¾
- Hvy. yellow brass solids 15
- Brass pipe 14
- Radiators 16

Aluminum

- Mixed old cast. ..... 14 —14½
- Mixed new clips ..... 15 —16
- Mixed turnings, dry ..... 14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 22¾—23
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18½—19
- Auto radiators (unsweated). 12½—13
- No. 1 composition ..... 17 —17½
- No. 1 composition turnings.. 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

EXPLORE INNER SPACE...

Tap the full resources of your plant's productive capacity. Discover the unused ceiling space that can be put to use with American Monorail.

Monorail systems reduce floor traffic and make more space available for workers and machines.

A great variety of equipment is available and can be engineered to solve your problem. We've specialized in this equipment for 34 years and your installation will be guaranteed.

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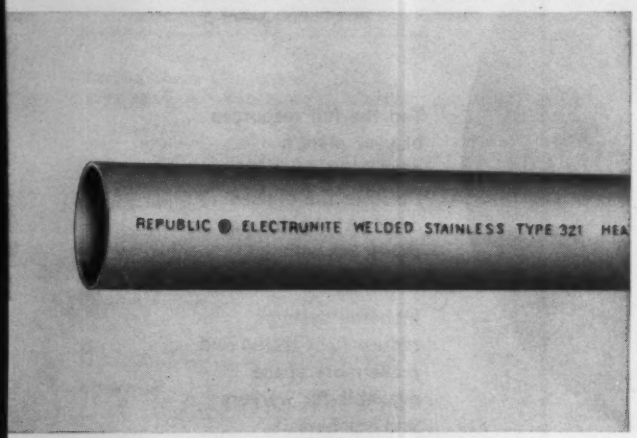
Grumman Aircraft Engineering...
SAVES TAXPAYER DOLLARS WITH REPUBLIC ELECTRUNITE STAINLESS STEEL TUBING

Grumman Aircraft Engineering Corporation has substantially reduced production costs of the exhaust system used in the Grumman S2F Tracker, through the use of Republic ELECTRUNITE Stainless Steel Tubing.

Since using ELECTRUNITE, Grumman has reduced scrap loss by 50%. Fabrication time is 30% less, with further savings through longer tool wear.

ELECTRUNITE® Stainless Steel and Carbon Steel Tubing is available in a wide range of sizes, gages, wall thicknesses, to meet practically any national security, manufacturing, fabricating, and pressure tubing application. Call your Republic representative for complete information and specifications. Or, write direct.

Republic ELECTRUNITE Stainless Steel Tubing, Type 321, is used in the exhaust system of the Grumman S2F Tracker, saving taxpayer dollars. ELECTRUNITE can save money for you, too.



Further savings are realized through Republic's Steel and Tubes Division manufacturing facilities of bending, forming, welding operations. Write for information.

REPUBLIC HS6460 HIGH STRENGTH POWDER can be used to produce comparable strength structural parts at lower manufacturing costs than obtainable with copper infiltration. Additional production economies can be achieved because fewer operations will be required to obtain high density, higher strength parts. HS6460 is capable of a minimum tensile strength of 60,000 psi at 6.4 density —100,000 psi after heat treatment. Write today.

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- ☐ Republic Steel and Tubes Division Manufacturing Facilities
- ☐ Republic HS6460 High Strength Powder
- ☐ Republic Galvannealed Sheets
- ☐ Republic Berger Division Contract Facilities

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective May 27, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective May 27, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1, Y1, F2*	6.725 *U1, Y1*	9.025 *Y1,F2*	8.30 *U1, Y1*	5.30 *U1, R3, Y1*		7.50 *Y1*	7.95 *U1, Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 27, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	7.66	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.193	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	9.82	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅝"; cold drawn—15/16" to 2⅛" round; Hot-rolled 4140—⅝" to 2⅛" round. cold drawn—15/16" to 2⅛" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective May 27, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective May 27, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	....	212	193	9.00	9.55
Aliquippa *J3***	173	190	....	....	190	9.00	9.675
Atlanta *A8***	175	193	....	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	....	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	....	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	....	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	....	219	203	9.10	9.775
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet, Ill. *A5*	173	187	....	212	193	9.00	9.55
Kokomo *C9**	175	189	....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

(Effective May 27, 1960)

C ELECTRIC FURNACE STEEL CASTINGS

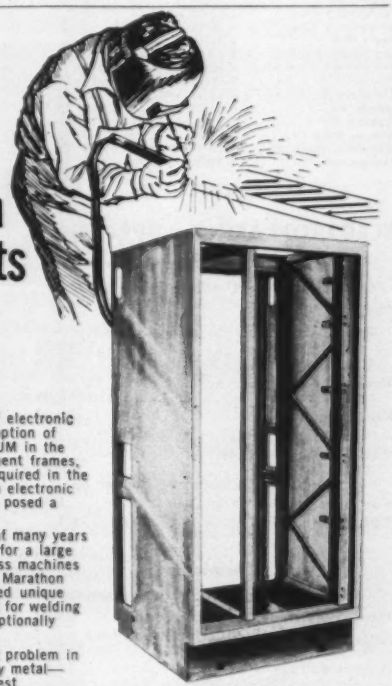
are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 1, PENNA.



NOW aluminum weldments —in close tolerance components!

Since the early days of electronic computers and the adoption of lighter weight ALUMINUM in the manufacture of component frames, precision tolerances required in the development of modern electronic computer devices have posed a serious problem.

Out of the experience of many years of component building for a large manufacturer of business machines and computer devices, Marathon Industries has developed unique methods and equipment for welding ALUMINUM within exceptionally close tolerances.

If you have a weldment problem in ALUMINUM—or with any metal—write or call your nearest Marathon Industries branch, TODAY!

COMPLETE METAL FABRICATION, ELECTRONIC ASSEMBLY

MI

MARATHON INDUSTRIES, INC.
61 Huntington St., Cortland, N. Y., SKyline 6-2866
Lexington, Ky., Phone 5-0020

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	8.95	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M8*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 48.00
Electrodeposited, 5000 lb lots ... 39.50
Brass, 80-20, ball anodes, 2000 lb or more 53.00
Zinc, ball anodes, 2000 lb lots 20.50
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.40
Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum..... 65.90
Copper sulphate, 25.2 Cu min, 6000 to 12,000 lbs per cwt $13.75
Nickel sulfate, 5000 to 23,000 lbs... 29.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 25.00
Zinc cyanide, 100 lb 60.75
Potassium cyanide, 100 lb drum N. Y. 45.50
Chromic acid, flake type, 10,000 lb or more 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe.... 28.75
Carbonyl Iron 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 46.5 to 64.5
Reduced ..... 15.00†
Chemically Precipitated 15.00†
Brass, 5000-lb lots ..... 35.1 to 52.2
Bronze, 5000-lb lots ..... 53.1 to 56.7
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum .....$3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 60.7 to 69.0
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 14.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten .....$3.15 (nominal)

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective May 27, 1960)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 140.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays, Latrobe, Pa. 163.00
Chicago District 168.00
Western Utah 183.00
California 165.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 163.00-168.00
Silica cement, net ton, bulk, Latrobe 29.75
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.$109.00
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Balt. 103.00

Magnesite Brick

Standard, Baltimore $140.00
Chemically bonded, Baltimore 119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

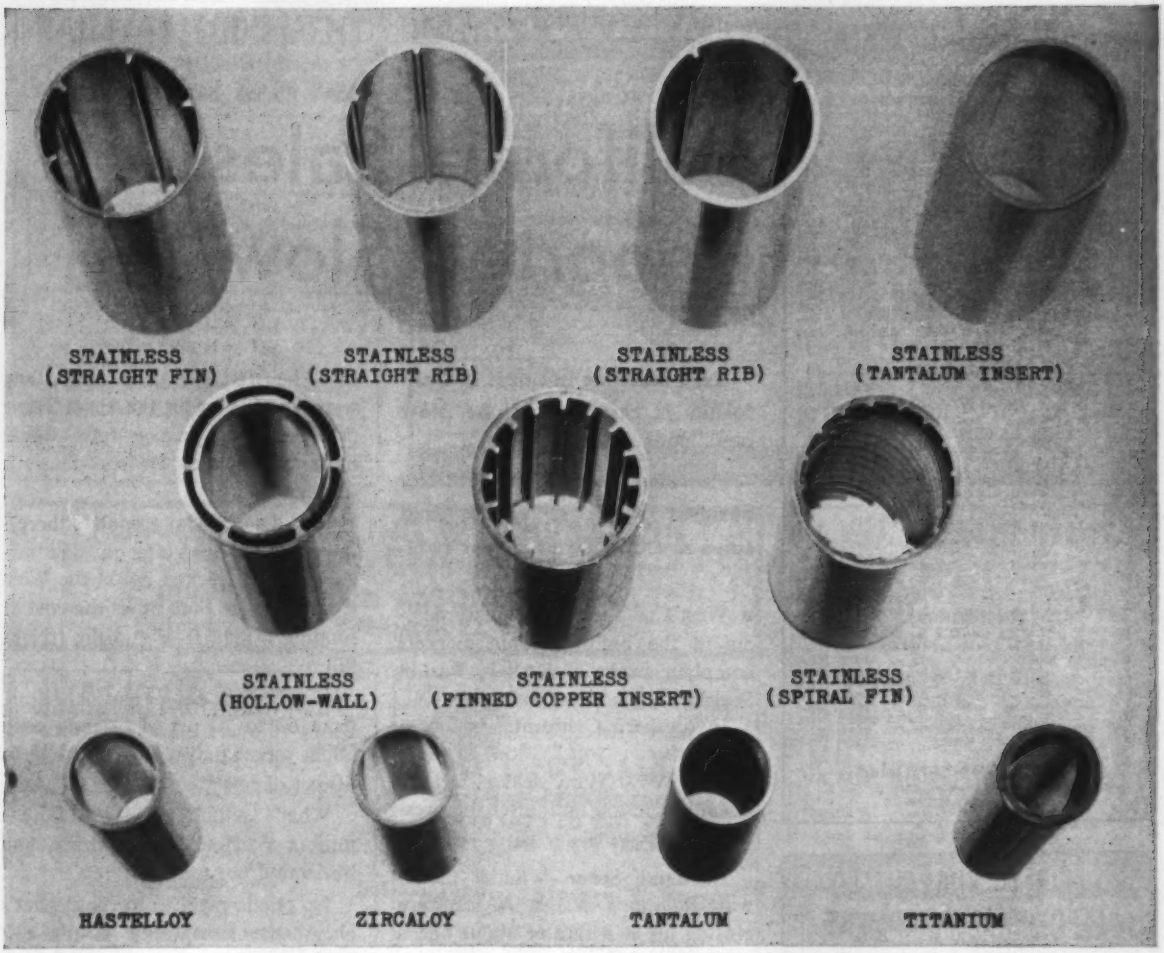
Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....



ALL OF THESE TUBES WERE PRODUCED by a remarkable new process called FLO-ROL

Tubes like these have never been economically available before. The entirely new process, known as FLO-ROL, will produce a wide variety of internal configurations, in high cost alloys, stainless steel, and other hard-to-work metals, plus many bi-metal and tri-metal combinations. Wall tolerances for FLO-ROL tubing can be held to ±.0005" and diameters to ±.002" depending on sizes.

- *Internally Finned Tubes* offer increased surface for more rapid heat transfer.
- *Bi-Metal Tubes*—stainless steel tubes with tantalum, zirconium, or other expensive material offer exceptional corrosion-resistant qualities without the prohibitive cost.
- *Hollow Wall Tubes* or barrier tubes are available in several designs for nuclear work or other special applications where a chambered tube is essential or desirable.
- *Thin Wall Tubes* for pneumatic lines are available with .015" wall or lighter.

FLO-ROL precision tubular products can be furnished from ½" to 2½" O.D. and, in some instances, in lengths up to 75'. For complete information contact your nearest Damascus representative or write direct. For prompt service send prints and specifications—we will be happy to work with you.

Send for new FLO-ROL PRECISION TUBE BULLETIN TODAY

DAMASCUS TUBE COMPANY

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

GUARANTEED—RE-NU-BILT
Electric Power Equipment — A. C. Motors
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	500	1776
1	800	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse	CW	550	350
1	300	A.C.	ANY	440/2200	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-12B	220	1800
2	200	Whse.	CW-890	2300	1775
2	200	G.E.	IM-17A	2200	435
1	200	G.E.	IM	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151 610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-875S	2200	1775
1	200	Whse.	CSP-581S	440	3450
2	200	Whse.	CS-855S D.P.	220/440	1750
1	200	Whse.	CS-873C	2200	1160
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607	220/440	1780

SYNCHRONOUS

1	6000	G.E.	ATI.8	200/6600	600
1	3500	G.E.	TS 1.0	4600/2300/4000	360
1	2000	G.E.	ATI	2300	900
2	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	700	G.E.	TS.8P.F.	2300	1200
1	400	G.E.	TS-756S	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	140	1800
2	300	El Mach.	BRKT	2200	1200

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3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	5000	Ideal	Mill	6600/4160	440
1**	2500	G.E.	Mill	2300	296
1**	2500	G.E.	Mill	6600/4160	257
1**	1800	Whse.	Mill	2300	252
1**	1750	Whse.	Mill	2300	234
1**	1500	Al.Ch.	Mill	2300	508
1**	1300	Al.Ch.	Mill	2300	353
1**	1200	Al.Ch.	Mill	2300	505
1**	900	Al.Ch.	Mill	2300	160
1*	700	Whse.	CW-1224A	2300	585
1	500	Al.Ch.	ANY	2300	1175
1	500	Ideal	S-4-20	4800	708
1*	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2300	293
1*	400	Al.Ch.	ANY	2300	505
1	400	Whse.	CW	2300	290
3	350	G.E.	I-M	2200	1180
1	300	G.E.	IE-15B	440	1200
1	300	Whse.	CW-1012	2200	704
1	250	Whse.	CW	4100/2400	710
1	250	Cr.Wh.	SR size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300

**—Heavy duty, pedestal bearing, stator shifting bases.
*—Heavy duty, pedestal bearing, standard base.

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Qu.	Amps.	KV	Make	Type	Int. Cap.
(Air—3-Pole)					
3	1200	14.4	G.E.	ARA	1000 M.V.A.
2	1200	5	G.E.	AM	100 M.V.A.
(Oil—3-Pole)					
1	400	73	Whse.	G-11	500 M.V.A.
1	600	69	G.E.	FK-339	500 M.V.A.
1	600	37	G.E.	FHKO-236	500 M.V.A.
1	400	37	G.E.	FHKO-136	250 M.V.A.
1	600	34.5	Al.Ch.	FZO-50-34X	250 M.V.A.
1	600	7.2	G.E.	FKO-227	50 M.V.A.

Transformer & Switchgear Package
3—833-KVA Allis-Chalmers Transformers, 1 ph., 60 cy., 13475/12375-11000/10175-V. Prim., 2300/4000-V. Secondary
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California Sales Are Reported Slow

Used machine business in California is reported to be slow and "unexciting."

However, Seattle dealers say business there is strong and sales are coming at a fast rate.

■ West Coast used machinery dealers in the big California markets complain business is slow. But in Seattle, things are looking up.

In southern California, you hear the market is "soft," "slow," "unexciting." Why? Many dealers feel it's a waiting period until after the presidential elections.

Changing Scene — Small metalworking shops in Los Angeles are closing up at a rate of about one a week. They're victims of the changing complexion of the aircraft-missile business. More missiles and less aircraft. Auctioned machines from these shops keep a steady flow of equipment into dealers' showrooms.

Dealers are moving a little bit of everything. Though their inventories are ample, they still need machines made in 1950 or later.

North Spotty — Business among northern California dealers is quite spotty. Reports run from fair to poor. A few dealers report considerable softening of prices. One puts it this way, "The customer now is king. Some machines can be picked up at less than the dealer's cost."

However, not everyone goes along with this. One executive, who claims prices are firm, did admit that on old equipment, 10 years or older, there is a tendency toward price weakness.

East vs West—Dealers contacted by The IRON AGE said they were not buying in the East. Their customers, they say, are doing more buying directly from Eastern sources.

One dealer, who contends there's quite a bit of this going on, said bargains can be picked up on the West Coast to more than offset the cost of sending a man East and the freight bill.

Good used equipment is selling from 60 to 70 pct of original cost. Older merchandise moves as low as 40 pct of new.

What's selling? Turret lathes, milling machines, radial drills, and horizontal boring mills.

No one is eager to forecast what's ahead. Dealers won't be too unhappy if present conditions hold steady for the balance of the year.

Seattle Demand Up—In Seattle, there's a sharp increase in demand for used machinery. It follows on the heels of a report that Washington State employment had, for the first time, topped a million in April. The employment picture appears well on the way to beating the state's all-time high before the year's end.

"I guess maybe everyone was leaning back to see what might happen. It has. Things now look pretty good." That's the comment of a leading Seattle used machinery dealer.

Prices Up—For the first time in many months, the need includes large-size machines.

Prices are up along with the new demand. There's a lot of bottom-of-the-barrel scraping for equipment.

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1—72" WHEELABRATOR Swing Table *machines*
1—WHEELABRTOR No. 1-A Multi-Table
1—48" WHEELABRATOR Swing Table
1—PANGBORN Pipe Cleaner, 2" to 16" O.D.
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1—WHITING 26"x54" tumbling barrel

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191 CFM	300 psi	9-4½ x 9 ES-2
194 CFM	125 psi	7-7-8 x 5 Worth. M40
234 CFM	100 psi	9 x 9 Ing.—Worth. Chic Penn
290 CFM	75 psi	10 x 9 Ing. ES-1
384 CFM	100 psi	10 x 9 Joy WG9
485 CFM	100 psi	12 x 11 IR—Amer.
562 CFM	125 psi	12 x 13 Ing. Rand.
585 CFM	100 psi	15-9¼ x 12 Ing.
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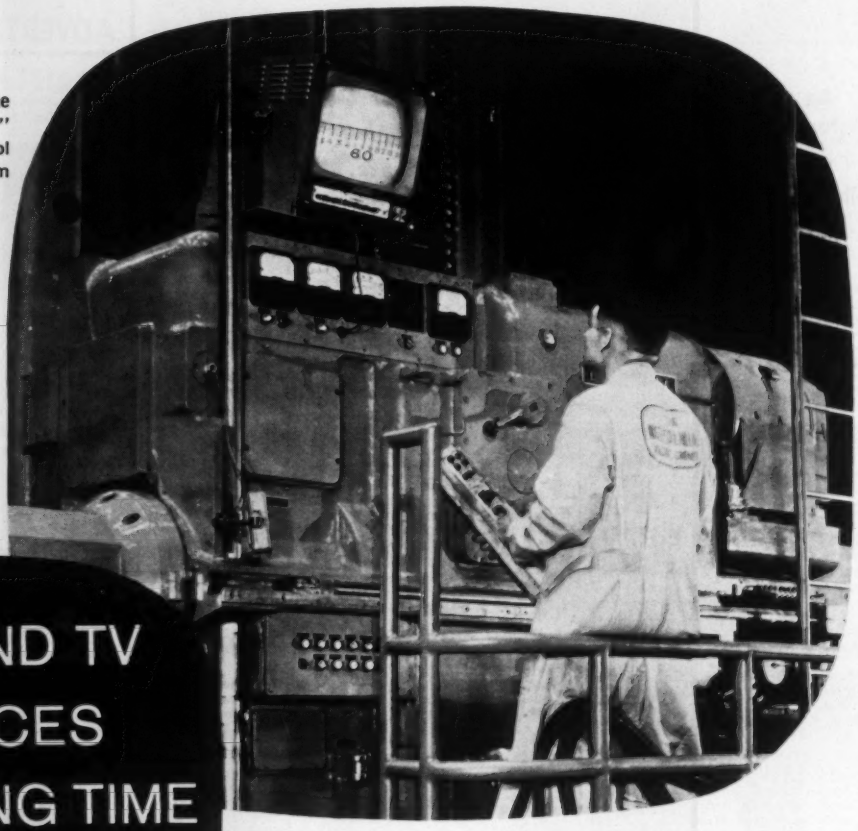

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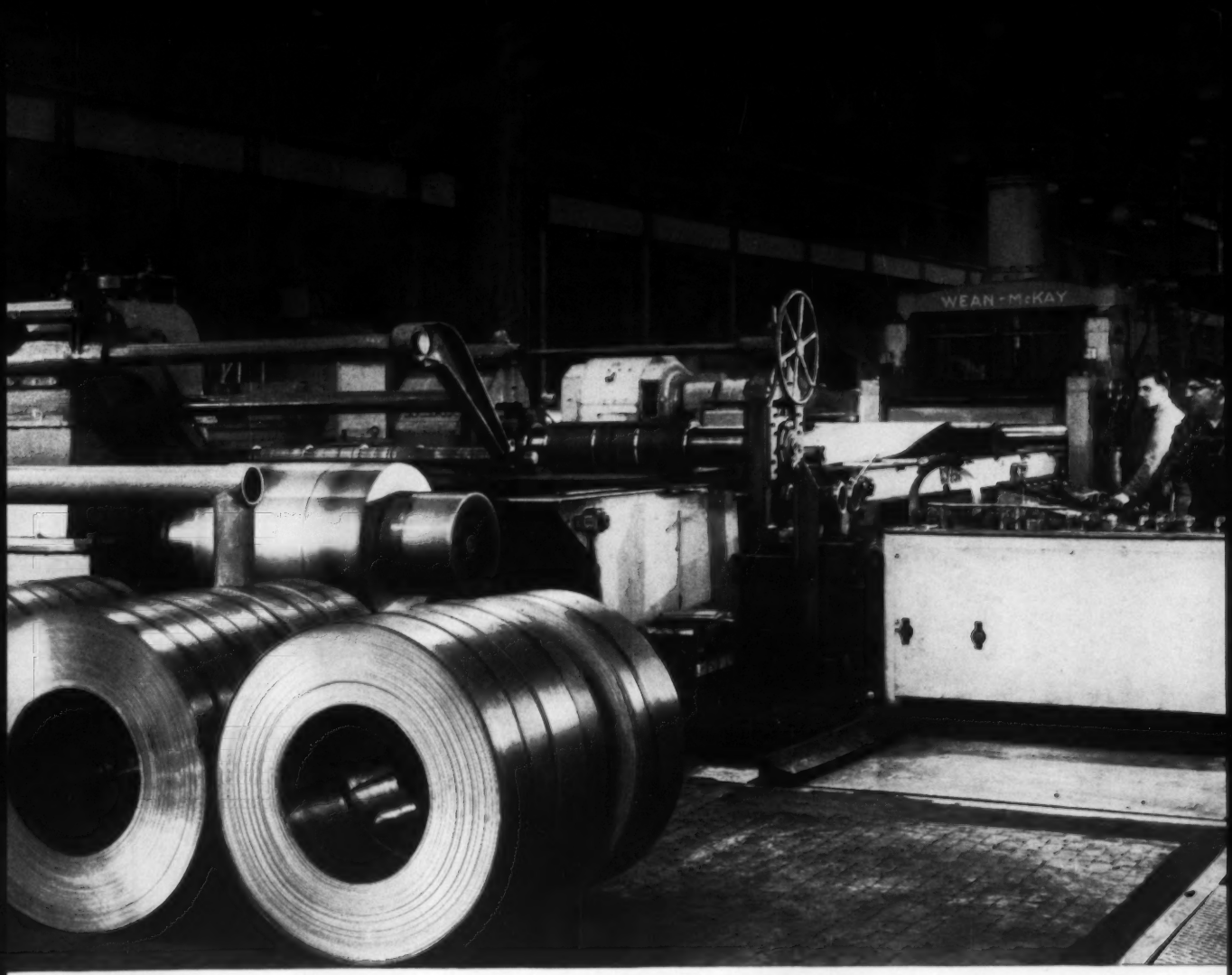

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